A STUDY OF DIAGNOSTIC LAPROSCOPY IN INTRA ABDOMINAL MALIGNANCIES

Dissertation
Submitted in partial fulfillment of the regulations of

M.S. DEGREE EXAMINATION

BRANCH I GENERAL SURGERY

Department of General Surgery

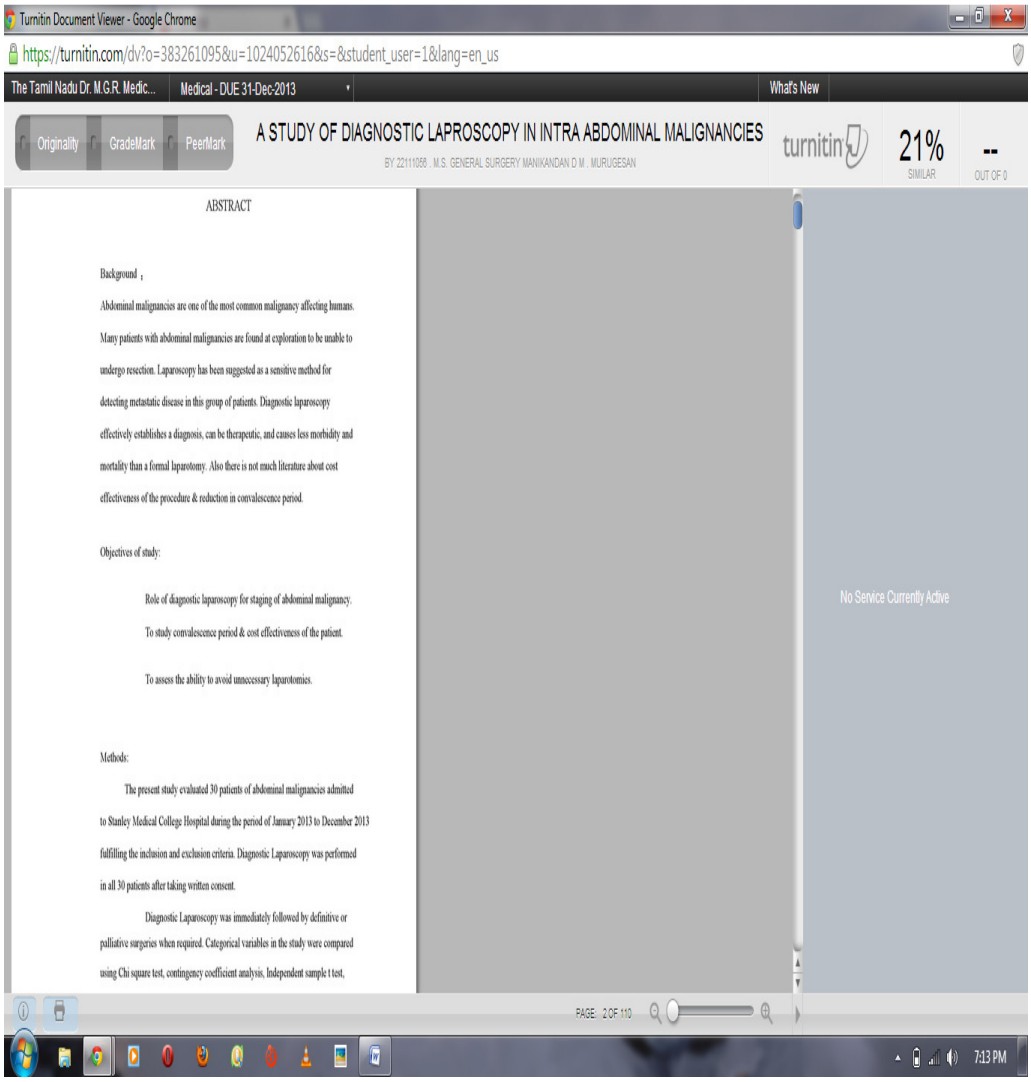
GOVT. STANLEY MEDICAL COLLEGE AND HOSPITAL

CHENNAI - 600001

THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY

CHENNAI

APRIL 2014


Turnitin Document Viewer - Google Chrome
https://turnitin.com/dv?o=383261095&u=1024052616&s=&student_user=1&lang=en_us
The Tamil Nadu Dr. M.G.R. Medic...
Medical - DUE 31-Dec-2013
What's New
Originality
GradeMark
PeerMark
A STUDY OF DIAGNOSTIC LAPROSCOPY IN INTRA ABDOMINAL MALIGNANCIES
BY 22111056 . M.S. GENERAL SURGERY MANIKANDAN D M . MURUGESAN
turnitin
21%
SIMILAR
--
OUT OF 0
ABSTRACT
Background :
Abdominal malignancies are one of the most common malignancy affecting humans. Many patients with abdominal malignancies are found at exploration to be unable to undergo resection. Laparoscopy has been suggested as a sensitive method for detecting metastatic disease in this group of patients. Diagnostic laparoscopy effectively establishes a diagnosis, can be therapeutic, and causes less morbidity and mortality than a formal laparotomy. Also there is not much literature about cost effectiveness of the procedure & reduction in convalescence period.
Objectives of study:
Role of diagnostic laparoscopy for staging of abdominal malignancy.
To study convalescence period & cost effectiveness of the patient.
To assess the ability to avoid unnecessary laparotomies.
Methods:
The present study evaluated 30 patients of abdominal malignancies admitted to Stanley Medical College Hospital during the period of January 2013 to December 2013 fulfilling the inclusion and exclusion criteria. Diagnostic Laparoscopy was performed in all 30 patients after taking written consent.
Diagnostic Laparoscopy was immediately followed by definitive or palliative surgeries when required. Categorical variables in the study were compared using Chi square test, contingency coefficient analysis, Independent sample t test,
No Service Currently Active
PAGE 2 OF 110
7:13 PM

DECLARATION

I, **DR. MANIKANDAN. D. M** .solemnly declare that this dissertation titled "**A STUDY OF DIAGNOSTIC LAPROSCOPY IN INTRA ABDOMINAL MALIGNANCIES**" is a bonafide work done by me in the Department of General Surgery, Government Stanley Medical College and Hospital, Chennai under the guidance and supervision of my unit chief.

Prof.K.KAMARAJ, M.S.,
Professor of Surgery

This dissertation is submitted to The Tamilnadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the university regulations for the award of M.S., Degree (General Surgery) Branch - I, Examination to be held in April 2014.

Place: Chennai.
Date: December 2013. **DR.D.M.MANIKANDAN**

CERTIFICATE

This is to certify that this dissertation titled

"A STUDY OF DIAGNOSTIC LAPROSCOPY IN INTRA ABDOMINAL MALIGNANCIES "

is the bonafide work done by **Dr. Manikandan .D.M,** Post Graduate student (2011 – 2014) in the Department of General Surgery, Government Stanley Medical College and Hospital, Chennai under my direct guidance and supervision, in partial fulfillment of the regulations of The Tamil Nadu Dr. M.G.R Medical University, Chennai for the award of M.S., Degree (General Surgery) Branch - I, Examination to be held in April 2014.

Prof. K. KAMARAJ, M.S.,
Professor and Head of Surgery,
Dept. of General Surgery,
Stanley Medical College,
Chennai-600001.

PROF. S. GEETHA LAKSHMI, M.D., PhD,
The Dean**,**
Stanley Medical College,
Chennai-600001.

ACKNOWLEDGEMENT

I am grateful to **Prof. S. Geethalakshmi,** Dean, Govt. Stanley Medical College for permitting me to conduct the study and use the resources of the College.

My sincere thanks to **Prof. K. Kamaraj,** Professor and HOD, Department of General Surgery, for his valuable guidance throughout the study.

I am highly indebted to my guide **Prof. K. Kamaraj,** Professor of Surgery for his constant help, inspiration and valuable advice in preparing this dissertation.

I express my deepest sense of thankfulness to my Assistant Professors **Dr.Anto, Dr.Abraham Jebakumar and Dr.Shanmugham** for their valuable inputs and constant encouragement without which this dissertation could not have been completed.

I consider it a privilege to have done this study under the supervision of my beloved former Professor and Head of the Department **Prof. P. Darwin**, who has been a source of constant inspiration and encouragement to accomplish this work.

I am particularly thankful to my fellow postgraduate colleagues Dr.Hariprasad and Dr.Surendar for their valuable support in the time of need throughout this study.

I would be failing in my duty without acknowledging the contribution of my friends Dr. Jeevanantham, Dr.Rakesh Chandru , Dr .Praveen Kumar, Dr. Anbarasan, Dr.Palani, Dr.Jeevan prakash in helping me in completing this dissertation

It is my earnest duty to thank my parents without whom accomplishing this task would have been impossible.

I am extremely thankful to my patients who consented and participated to make this study possible.

ABSTRACT

Background

Abdominal malignancies are one of the most common malignancy affecting humans Many patients with abdominal malignancies are found at exploration to be unable to undergo resection. Laparoscopy has been suggested as a sensitive method for detecting metastatic disease in this group of patients. Diagnostic laparoscopy effectively establishes a diagnosis, can be therapeutic, and causes less morbidity and mortality than a formal laparotomy. Also there is not much literature about cost effectiveness of the procedure & reduction in convalescence period.

Objectives of study:

- Role of diagnostic laparoscopy for staging of abdominal malignancy.
- To study convalescence period & cost effectiveness of the patient.
- To assess the ability to avoid unnecessary laparotomies.

Methods:

The present study evaluated 30 patients of abdominal malignancies admitted to Stanley Medical College Hospital during the period of January 2013 to December 2013 fulfilling the inclusion and exclusion criteria. Diagnostic Laparoscopy was performed in all 30 patients after taking written consent.

Diagnostic Laparoscopy was immediately followed by definitive or palliative surgeries when required. Categorical variables in the study

were compared palliative surgeries when required. Categorical variables in the study were compared using Chi square test, contingency coefficient analysis, Independent sample t test, one sample t test using SPSS software. P value of < 0.05 was considered to be significant.

Results :

Study included total of 30 patients comprising of stomach, biliary & colorectal malignancies with mean age of 53 years (21-70). 13 cases (43.3%) were found to be unresectable on staging laparoscopy and prevented from undergoing unnecessary laparotomy. 6 cases(20%) had liver metastases & 8 cases(26.7%) had peritoneal seedings on staging laparoscopy which were not revealed on preoperative imaging workup. Mean duration of Staging Laparoscopy was 18.83 min (10-30mins). Staging Laparoscopy had minimal major complication rates. Mean convalescence period was 8.2 days for study group & Mean cost for study group was Rs 8,897. It was significantly lower compared to open exploration.

Interpretation and Conclusion:

A short SL performed just before the planned surgical procedure to certify the operability is found to be safe & very effective. It is very accurate in assessing peritoneal seedings, hepatic metastases which are

not found on imaging modalities. Staging laparoscopy has a significant impact on decisions regarding the treatment plan , helps in more careful planning of palliative & resectional procedure in advanced conditions, performing biopsy from sites of dissemination & having histological confirmation. It spares patients from unnecessary laparotomies and has been found to significantly decrease the hospital stay & cost expenditure when compared to open exploration. Staging Laparoscopy should be a routine tool in the armamentarium of all surgeons.

Keywords :

Laparoscopic Surgery, Staging, Gastric, Colorectal, Gall bladder

LIST OF ABBREVIATIONS

CEA	Carcino Embryonic Antigen
CO_2	Carbon Dioxide
CONVAL	Convalescence
CRS	Clinical Risk Score
CT	Computerized Tomography
DL	Diagnostic laparoscopy
ERCP	Endoscopic Retrograde Cholangio Pancreatiography
$etCO_2$	End-tidal CO_2
EUS	Endoscopic Ultrasound
GI	Gastro Intestinal
H2	Histamine $_2$
HCC	Hepatocellular carcinoma.
LFT	Liver Function Test
LUS	Laparoscopic Ultrasound
MRCP	Magnetic Resonance Cholangio Pancreatiography
MRI	Magnetic Resonance Imaging
O_2	Oxygen
$PaCO_2$	Partial Arterial pressure of Carbon Dioxide
PET	Positron Emission Tomography
PTC	Percutaneous Transhepatic Cholangiography
R	Resectable
SL	Staging Laparoscopy
TNM	Tumour Node Metastases
TV	Television
U	Unresectable

TABLE OF CONTENTS

INTRODUCTION

Abdominal malignancies are one of the most common malignancy affecting humans. The purpose of this study is to determine if a laparoscopic approach that mimics open exploration would improve the accuracy of management of patient. Many patients with abdominal malignancies are found at exploration to be unable to undergo resection. Laparoscopy has been suggested as a sensitive method for detecting metastatic disease in this group of patients. In oncologic practice, minimal access surgery has been proposed for the diagnosis, staging, palliation, and treatment of various malignancies without any substantive data confirming its effectiveness.

Diagnostic laparoscopy effectively establishes a diagnosis, can be therapeutic, and causes less morbidity and mortality than a formal laparotomy. The findings of a diagnostic laparoscopy might change the further course of management to a more limited approach or conservative line of management and help in avoiding unnecessary non-therapeutic laparotomies. Laparoscopy is as much a surgical procedure as an exploratory laparotomy, often just as informative, and to the trained surgeon affords a better view of the entire peritoneal cavity than the usual exploratory incision. To achieve a high rate of positive

diagnosis from laparoscopy requires much more than correct technique; it requires a thorough background of surgery, sound clinical acumen as also knowledge and awareness of abdominal pathology.

One of the most meaningful and important advances realized by the rebirth of interest in laparoscopy is in the area of cancer diagnosis and staging. Diagnostic laparoscopy is being increasingly employed for intra abdominal malignancies. Laparoscopy can prevent unnecessary exploration in many abdominal malignancy patients. This novel technique may reveal general metastases or secondary nodules in the liver, peritoneum or adenopathy, thus rendering further procedures unnecessary and saving the patient a rather prolonged convalescence. In this study the role of diagnostic laparoscopy in management of abdominal malignancy is being evaluated. This study is also intended to study convalescence & cost effectiveness to patient by preventing unnecessary exploration.

AIMS AND OBJECTIVES

AIM:

To study the role of diagnostic laparoscopy for staging in abdominal malignancies.

OBJECTIVES:

1. Role of diagnostic laparoscopy for staging of abdominal malignancy.
2. To study convalescence period & cost effectiveness of the patient.
3. To assess the ability to avoid unnecessary laparotomies.

REVIEW OF LITERATURE

History of Laparoscopy:

The Arabian physician Abulkasim (936-1013) is often credited with being the first to use reflected light to inspect an internal organ, the cervix. Other investigators subsequently developed instruments to examine the nasal recesses and the urinary bladder with the aid of artificial light and mirrors. The usefulness of photography to record endoscopic findings was recognized early, and by 1874 Stein had modified existing cameras to record images of bladder pathology.

In 1901 Kelling reported using a cystoscope to inspect the peritoneal cavity of a dog after insufflation with air. He then coined the term "celioscopy", to describe this technique. The first report of using this procedure in man was by the Swedish physician Jacobaeus in 1910. These early procedures, however, were entirely diagnostic in nature; the exposure obtained and the instruments available did not allow operative intervention. The early pioneers introduced their trocars and cystoscopes directly into the peritoneal cavity. It was another 30 years before pneumoperitoneum was used prior to insertion of the first cannula. Goetz and later Veress developed an insufflation needle for the safe introduction of gas into the abdomen.

The introduction of an endoscope through the abdominal wall was initially associated with a number of major and minor complications. The risk of injury to underlying bowel and vascular structures has always been a major concern of clinicians performing this procedure. In 1946 Decker introduced an a1ternative method of placing the laparoscope into the abdominal cavity in an attempt to minimize this complication. He inserted the scope into the pelvis through the cul-de-sac and named the procedure culdoscopy.

Kurt Semm in Kiel, Germany, developed an automatic insufflation device that monitored abdominal pressure and gas flow. Prior to this time air was introduced into the peritoneal cavity by means of a syringe. The introduction of fiber optic (cold) light sources in the early 1960s eliminated the risk of bowel burns caused by incandescent lighting, bowel injuries related to unipolar coagulation. In 1986, the problem of laparoscopic visualization of abdominal cavity was solved with the development of a computer chip TV camera attached to the laparoscope.

The fear of uncontrolled bowel injuries from monopolar coagulation also prompted many gynecologists to adopt the laser as a dissecting and coagulation device. The first clinical report describing laser energy for operative pelvioscopy was by Bruhat, Mage, and

Manhes in 1979. Subsequently, laser light has been used for coagulation and enucleation of endometrial implants, treatment of ectopic pregnancy with preservation of the affected adnexa, adhesiolysis.

The first laparoscopic procedure performed by general surgeons appears to have been liver biopsies guided under direct vision. Clinical investigators rapidly recognized the versatility of this procedure in obtaining tissue from other areas of the abdominal cavity. Warshaw, Tepper, and Shipley utilized laparoscopy in 1986 for staging of pancreatic carcinoma and demonstrated an overall accuracy rate of 93%.

EQUIPMENTS USED IN LAPAROSCOPY

Laparoscopic Instrumentation and Operating Room Setup Laparoscopic instrumentation continues to evolve at a rapid pace, there is, however, a basic set of equipment necessary for safe and effective diagnostic laparoscopy.

1. 0-degree or 30-degree angled laparoscope either 5 or 10 mm in diameter
2. 5-mm laparoscopic instruments including maryland dissector, blunt-tip dissecting forceps, cup-biopsy forceps, atraumatic grasping forceps, liver retractor, and scissors
3. 5- or 10-mm suction/irrigation device
4. Laparoscopic ultrasound probe (optional)

Fig 1. Standard instruments used for diagnostic laparoscopy

Individual choices as to whether disposable, reusable, or combination disposable/reusable instrumentation is preferable should be based on surgeon preference, cost, and availability. Standard instruments are shown in Fig.1. The basic tray consists of a scissors, grasper, and dissector. As electrocautery is used during the procedure, all instruments are insulated to the tip. This setup fulfills our needs and is extremely cost-effective.

Laparoscopic telescopes are either forward-viewing (0-degree) or oblique (30- to 45-degree). Oblique views are essential to visualize relatively inaccessible regions of the abdomen, such as the dome of the liver. In our opinion, the oblique telescope is an essential part of diagnostic laparoscopy, particularly in cancer staging. It is important to note that the first and rate-limiting step in obtaining a clear image on the monitor relies on the quality of the telescope and, thus, diligent maintenance and handling should be the rule when handling the telescopes. In addition, simple measures such as warming the telescope prior to insertion are effective in maintaining image quality. Currently generally use the 10-mm telescope is done; however, recent improvements in optical technology have enabled excellent 5-mm angled telescopes to be developed that are now gaining popularity.

Patient Positioning

The procedure is generally performed under general anesthesia with the patient positioned supine on the operating table. A warming blanket is placed underneath the patient, who is secured appropriately to the table with padding over the pressure points.

For the majority of diagnostic procedures, the surgeon stands on the right side of the patient with the assistant on the left side Fig.2. Monitors are positioned to the head of the table with the equipment tower placed opposite the operating surgeon to facilitate easy viewing. For pelvic procedures, the monitors can be placed towards the foot of the patient.

Abdominal Access:

Pneumoperitoneum can be established by either an open or closed technique. Irrespective of the method used, the abdominal skin is prepared and draped in standard fashion as for a laparotomy, should it be required. A urinary catheter is generally not placed. However, the patient is asked to empty the bladder prior to induction of anesthesia in order to minimize the risk of inadvertent bladder injury.

The needle-trocar method is a closed technique initially described by Veress in 1938. The concept is that needle insufflation creates a pneumoperitoneum, which elevates the anterior abdominal wall while compressing the viscera, allowing safe placement of the initial laparoscopic port. With the patient in the trendelenburg position, the veress needle is inserted in the midline, below the umbilicus, aiming toward the pelvis at 45 degrees to the horizontal. During insertion, the abdominal wall should be grasped on either side, with towel clips if necessary, and lifted away from the viscera. As the needle passes through the fascia and into the peritoneal cavity, the surgeon should feel a loss of resistance to the needle. Correct peritoneal placement can be assessed by a number of methods, none of which are failsafe. First, the needle can be aspirated to exclude bladder, visceral, or vascular placement. The saline drop test indicates lack of resistance to flow and probable correct placement.

Saline, in a 5-mL syringe on the end of the needle, is sucked into the abdomen when the needle tip enters the vacuum created by the lifted abdominal wall. Finally, intra-abdominal pressures should be measured. In general, pressures below 5 mm Hg are considered normal.

Following confirmation of satisfactory placement, the needle is connected to the automatic insufflator. Initial insufflation should be set at a low flow rate until peritoneal entry is confirmed. If a high pressure reading is seen initially, it suggests that the needle is not in the peritoneal cavity and may be in the preperitoneal space. The needle then requires repositioning. A low pressure reading allows high flow to be activated and the CO pneumoperitoneum can then be achieved to a level of 10 to 15 mm Hg, at which time flow automatically discontinues.

Once adequate pneumoperitoneum is established, a small skin incision is made in the midline, below the umbilicus, and a 10- to 12-mm trocar is then inserted in the same manner as the veress needle. Trocars may have a spring-loaded “safety shield” that protects the sharp edge of the trocar on entering the peritoneal cavity and locks in position to prevent organ injury

A second closed technique is direct trocar insertion without using a veress needle. After incising the skin, the abdominal wall is grasped and pulled up to lift it away from the viscera while the trocar is inserted as previously described in Fig.3. Proponents of this method suggest that grasping the normal abdomen is easier and more effective than grasping an abdominal wall that is distended by the pneumoperitoneum.

Despite the blind nature of both closed techniques, they are remarkably safe. However, serious complications have been reported. These complications include vascular and visceral injuries such as bowel injury, bladder perforation, hematoma, and extraperitoneal insufflation. The advantages and risks should be understood and their use individualized by the surgeon.

An alternative to the closed technique is the open cut-down usually performed subumbilically with a blunt trocar. This technique, popularized by Hasson in the early 1970s, is favored by us. Although it does not eliminate the possibility of visceral injury, it allows controlled entry under direct vision. A small skin incision is made below the umbilicus. A transverse “smile” incision is more cosmetic but a midline, longitudinal incision is easier to extend, should it be required. The umbilical stalk is followed down to the linea alba, which is then carefully incised using cautery. The dissection is performed under direct vision. The peritoneum is breached with a hemostat

Using a J-shaped needle, a 0-0 absorbable suture is placed in the fascia on each side. Upward force on these enables a blunt port and trocar to be inserted; they are then tied to the port, securing it in position. Threaded ports can be screwed to form an airtight seal, the

trocar is removed, and CO is insufflated as previously described. No single technique has been proven to be safer than another, and serious complications can occur in each, with the experience of the surgeon generally proving a major factor.

Diagnostic Laparoscopy for Malignant Disease

The technique of laparoscopic staging should mimic the operative assessment performed at open exploration. For upper gastrointestinal cancers, a multiport technique is used. This approach allows for a thorough examination of the peritoneal cavity.

The patient is placed supine on the operating table. As mentioned previously, we prefer to obtain access to the peritoneal cavity by an open modified Hasson technique through a subumbilical incision. The initial 1- to 2-cm incision is extended down to the fascia, which is incised in a vertical manner with the peritoneum under direct vision. A blunt port is inserted through the umbilical port and attached to a high-flow insufflator at a set flow rate of 10 to 15 L/min.

A 5- or 10-mm 30-degree angled telescope is used. Secondary 5- to 10-mm trocars are placed in the right (5- and 10-mm) and left (5-mm) upper quadrants along the line of a bilateral subcostal incision.

A four-quadrant systematic examination of the peritoneal cavity is performed for obvious peritoneal extension of disease. Peritoneal washings for cytologic examination are taken from the right and left upper quadrants after instillation of 200 ml into the peritoneal cavity prior to manipulation of the primary or metastatic tumour. Prior to aspiration, the abdomen is gently agitated. In patients with gastric cancer, a pelvic aspirate is also taken as this has been shown to increase the cell yield. The primary tumour is then assessed. Local extent, size, and fixation and possible extension to contiguous organs are considered.

The patient is placed in a 20-degree reverse trendelenberg position with 10 degree of left lateral tilt. This is important as it optimizes the exposure of the liver. The liver is “palpated” by using a blunt or rounded 10-mm instrument. This allows for indirect haptic feedback. The examination is sequential, with the anterior and posterior surfaces of the left lateral segment of the liver examined first, followed by the anterior and inferior surface of the right lobe. Improved visualisation of the dome of the liver may be achieved by moving the camera to the right upper quadrant port. The majority of the liver surface, with the exception of the posterior aspect of segments VII and VIII, can be examined. The hilus of the liver, hepatoduodenal ligament, and foramen of Winslow are then visualized. Periportal nodes can be

biopsied or excised if required.

The patient is then re-positioned in a 10-degree Trendelenberg position without lateral tilt, and the omentum is retracted toward the left upper quadrant in order to examine the colonic mesocolon. This is helped by elevating the transverse colon, which allows the ligament of Treitz to be identified. Care should be taken in grasping the bowel so as to avoid any visceral injury. The mesocolon is carefully inspected and any suspicious nodules or nodes can be biopsied if clinically indicated. On completion of this portion of the assessment, the patient is returned to a supine position. For the majority of patients with upper gastrointestinal tumours, this is the limit of the diagnostic procedure. However, for patients with pancreatic disease, there is added value to assess the lesser sac and celiac axis. To facilitate this maneuver, the left lobe of the liver is elevated and the gastrohepatic omentum is incised to gain entrance into the lesser sac. Hemostasis is achieved with the use of electrocautery or ultrasonic dissection. The caudate lobe of the liver, inferior vena cava and celiac axis can be examined. The use of an angled telescope is recommended as this facilitates examination of the anterior aspect of pancreas, hepatic artery, and left gastric artery. The course of the hepatic artery is visualized to the porta. Celiac, portal, perigastric, and hepatogastric nodes can be sampled if they appear suspicious.

After inspection to ensure adequate hemostasis, the ports can be removed under direct visualization using the laparoscope to ensure there is no visceral herniation or bleeding. As much of the pneumoperiteum as possible should be expelled from the abdomen to reduce postoperative shoulder pain. The easiest way to achieve this is to squeeze the abdomen before removing the umbilical trocar. We do not instill local anesthetic into the peritoneal cavity on completion of the procedure.

The fascia of any port site greater than 5 mm should be closed with an absorbable suture on a J-shaped needle. The skin is closed with either continuous or interrupted subcuticular sutures; steristrips may be applied and local anesthetic injected around the wound.

Systemic changes during laparoscopic surgery

Respiratory system:

During laparoscopic procedures performed under general anesthesia, controlled ventilation is often recommended to prevent hypercapnia, which can result from a combination of factor (e.g., narcotic analgesics, mechanical impairment of ventilation from CO induced abdominal distension and systemic absorption of CO from the peritoneal cavity).

If patients have a limited pulmonary reserve, the necessary increase in respiratory work may not be obtainable and respiratory failure may occur. The increase in PaCO cannot be prevented if high doses of sedatives are given because of central respiratory depression.

Continuous monitoring of peripheral O saturation is advisable in all patients since hypoxemia can occur from elevation of the diaphragm (loss of functional residual capacity) as a result of pneumoperitoneum. This is more likely to occur during spontaneous ventilation rather than controlled mechanical breathing.

Carbon dioxide embolus

CO is commonly used for laparoscopic surgery because it has a relatively innocuous effect on peritoneal surfaces and is highly soluble in the bloodstream. Intravascular entry of small amounts is generally not hazardous because CO rapidly absorbed via the splanchnic vascular bed. However, excessive intra-abdominal pressures or anesthetic techniques that reduce splanchnic blood flow may reduce its absorption and increase the likelihood of symptomatic gas embolus.

The presenting signs of CO embolus include a sudden, profound fall in blood pressure, dysrhythmia, mill wheel or other heart murmurs,

cyanosis and /or pulmonary edema. End-tidal CO (etCO) may increase abruptly as CO embolises. If the gas embolus is large, the etCO increase may be followed by an abrupt decrease. If right heart dysfunction is severe, blood is no longer delivered to the lungs. An important etiologic factor in the development CO embolus is high insufflation pressures. Excessive bleeding should alert the anesthesiologist to the possibility of a CO embolus.

Cardiovascular System

The reverse trendelenburg position required for laparoscopic procedures may result in decreased venous return, cardiac output, and blood pressure. In addition, insufflation of the abdominal cavity leads to an increase in total peripheral resistance, particularly if intra-abdominal pressures are high and the aorta is compressed. The effect of patient positioning and pneumoperitoneum on venous return and blood pressure is largely dependent on the patients' intravascular volume status prior to insufflation of CO . Volume loading with 10 to 20 ml/kg crystalloid solution prior to positioning minimizes these cardiovascular changes.

Cardiac dysrhythmia can occur during laparoscopy. Respiratory acidosis and the resultant sympathetic stimulation are thought to be the primary etiologic factors. Hypoxia and vagal stimulation may be other

contributing causes. Of the inhalation anesthetics, enflurane and isoflurane have a lower incidence of dysrhythmia than halothane, which increases endogenous catecholamines. During general anesthesia with controlled ventilation, cardiac dysrhythmia can be prevented by carefully regulating the PaCO .

Gastric Reflux

Gastric reflux is a significant concern when laparoscopy is performed using regional anaesthesia. Predisposing factors include obesity, hiatal hernia, increased intragastric pressure, excessive pneumoperitoneum, and aerophagia. The incidence of reflux and aspiration pneumonitis in high-risk patients can be minimized by careful selection of the anesthetic technique, prophylactic antacids and H2 blockers. In patients with suspected delayed gastric emptying (obese patients and those with hiatal hernia or diabetes mellitus), preoperative administration of metoclopramide, 10mg orally or intravenously, increases lower esophageal sphincter tone and gastric emptying and may reduce the likelihood of reflux.

Complications of diagnostic laparoscopy

1. Anesthesia

    a. Complications of general anesthesia/sedation

b. Vaso-vagal shock under local anesthesia

2. Insertion of pneumoperitoneum needle

Tip of needle, malpositioned in	Consequence
a. Pre -peritoneum	Emphysema
b. Hollow viscus	Perforation/distension
c. Localized adhesion	Localized pneumoperitoneum
d. Omentum	Omental emphysema
e. Blood vessel	Bleeding, air embolism
f. Retroperitoneum	Mediastinal emphysema

3. Pneumoperitoneum

a. Cardio respiratory embarrassment due to elevation of diaphragm, compression of inferior vena cava, hypercarbia if carbon dioxide is used.

b. Air embolism

4. Main trocar insertion

a. Hollow viscus perforation (stomach, bowel, and bladder)

b. Solid viscus injury (liver/spleen when grossly enlarged)

c. Blood vessel injury (In abdominal wall - varix, epigastric vessels, In peritoneal cavity - mesenteric vessels, retroperitoneal - aorta. vena cava. iliac vessels)

5. Examination

a. Injury with telescope

b. Flash burns during photography

6. Second puncture

Unlikely as under vision - Abdominal wall, blood vessel injury.

7. Transperitoneoscopic procedures

a. Bleeding after biopsy/diathermy

b. Biliary leak

c. Perforation after biopsy/diathermy

d. Bleeding/perforation while severing adhesions

e. Explosion with diathermy

8. Release of pneumoperitoneum

Pain if large volume of gas left behind

9. Exit

a. Ascites leak

b. Omental prolapse

10. Postperitoneoscopy

a. Immediate - evidence of any of above complications

b. Delayed – Infection, Ascites leak, Incisional hernia, Richter's hernia

CONTRAINDICATIONS TO LAPAROSCOPY

Absolute

- Unstable cardiopulmonary states
- Uncorrectable or severe coagulopathy
- History of generalized peritonitis
- Patients having undergone multiple previous laparotomies
- Bowel obstruction with massive intestinal dilatation with abdominal distention
- Abdominal wall infection, advanced pregnancy

Relative

- Chronic cardiopulmonary disorders
- Correctable or minimal coagulopathy
- Prior abdominal surgery
- Abdominal hernias
- Obesity
- Tense ascites (transudate from portal hypertension).

ANAESTHESIA

The general principles and consideration regarding the choice of anaesthesia for traditional open procedures also apply to laparoscopy. As with any operative procedure, success depends on team cooperation

and commitment. No special monitoring is required simply because the procedure is being performed under laparoscopic guidance.

The choice of the anaesthesia technique should be commensurate with the goal of returning patients to their normal life-style as rapidly as possible. The anaesthesia effects should dissipate shortly after the end of the procedure.

General Anaesthesia

General anaesthesia is advantageous because the cardiorespiratory status can be better controlled. Continuous end tidal CO (etCO) monitoring allows appropriate adjustments of minute ventilation to maintain normal PaCO levels and facilitates the rapid detection of CO embolus. A transient but rapid increase in etCO suggests a CO embolus. Controlled ventilation may reduce the incidence of dysrhythmia in comparison to spontaneous ventilation, particularly in the presence of central nervous system depressants and respiratory acidosis. Endotracheal intubation offers optimal protection of the airway. Appropriate depth of anaesthesia and the use of muscle relaxants minimize motion within the operative field and may shorten the operative time.

Local anaesthesia

This method is useful only in procedures of very short duration, primarily those of a diagnostic nature.

DIAGNOSTIC AND STAGING LAPAROSCOPIC PROCEDURES IN CANCER

During the last decade, laparoscopy has replaced open laparotomy as the preferred approach in patients who require surgical diagnosis and staging of cancer. The role of laparoscopy as a biopsy tool is reserved primarily for patients in whom a tissue diagnosis is needed to direct therapy but cannot be obtained by image-guided needle biopsy or by endoscopic means.

The liver and peritoneal surfaces are the most readily accessible sites for laparoscopic tumour biopsy. Other sites, which may be accessible to the laparoscope but may require more dissection for exposure and access include the intestinal mesentery and the retroperitoneum. Lymph nodes or other lesions in the para-aortic and caval regions of the retroperitoneum are especially difficult to access, whereas celiac and iliac nodes are more readily biopsied. Laparoscopy has also been used as a second-look procedure to evaluate responses to

therapy. Aspiration of ascites or peritoneal lavage can be performed and fluid sent for cytological analysis for possible intra-peritoneal shedding of tumour.

Staging Laparoscopy

Staging laparoscopy has become an important tool in the evaluation of patients with certain gastrointestinal malignancies who are being considered for curative resection. The magnified view of the laparoscope enables the surgeon to detect small liver or peritoneal metastases that are not visible with current non-invasive imaging modalities. In addition, the use of laparoscopic ultrasound may allow imaging of occult liver metastases or local tumour invasiveness that would preclude curative resection. In large series of patients with mixed upper gastrointestinal malignancies undergoing staging laparoscopy, the incidence of occult metastases not seen on preoperative imaging has been approximately 20%.

The accuracy of pre-operative staging was improved by laparoscopy in 41% of patients in one series of 389 patients, including several patients who had suspicious lesions on preoperative imaging that proved benign.

Laparoscopic staging can be helpful in lymphoma, oesophageal cancer, gastric cancer, pancreatic adenocarcinoma, hepatocellular carcinoma, carcinoma of the gallbladder, extrahepatic bile duct cancer, and selected periampullary cancers as well as in second look operations after chemotherapeutic regimens.

Most occult metastases are identified by laparoscopy with biopsy alone; however, the addition of laparoscopic ultrasound to the staging protocol may allow detection of disease elsewhere, particularly vascular invasion, that would also contraindicate resection. Some authors have advocated that diagnostic laparoscopy and laparoscopic ultrasonography should be used as an adjunct to pre-operative imaging studies in all patients with primary or metastatic intra-abdominal neoplasms because as compared with pre-operative imaging, the combination of diagnostic laparoscopy and laparoscopic ultrasonography provides more accurate information regarding staging and resectability, thereby helping to determine the extent of operation and reduce the number of unnecessary laparotomies.

Diagnostic laparoscopy (DL) plays two important roles for patients:

1. It spares patients from the experience of undergoing an exploratory laparotomy and

2. Identifies patients with locally advanced disease for neoadjuvant therapy.

There is good category II/III evidence that video-laparoscopic staging is valuable in certain gastrointestinal (gastric, esophageal, pancreatic and hepatobiliary) and intra-abdominal lymphomas, but no category I evidence (based on prospective randomized trials). The evidence available is all retrospective, but of sufficient consistency to indicate that laparoscopic staging adds to the primary (imaging) staging and often alters the clinical stage of the disease and hence the management of the individual patient.

Siewert affirms that beyond any doubt surgical laparoscopy constitutes a step forward in surgical methodologies and contributes to improve preoperative staging, especially for peritoneal carcinomatosis. It should be used if therapeutic benefits can be gained, as is true for neoadjuvant chemotherapy. Otherwise, benefits and risks must be evaluated carefully. Irresponsible usage of surgical laparoscopy is not beneficial for the doctor or for the patient.

Rosin et al. define important technical aspects regarding diagnostic laparoscopy. The first controversial issue is its timing: it can be a separate procedure, or performed immediately before the planned

curative surgery. Another unresolved debate is the extent of the procedure: it ranges from inspection only, with biopsy of suspicious lesions, to extensive dissection, use of LUS, and peritoneal cytology sampling.

Luis F. Onate-Ocana et al define a four group staging system:

stage I, no serosal involvement;

stage II, serosal involvement;

stage III, adjacent organ invasion; and

stage IV, distant disease

The proposed staging system is a simplification of the TNM staging and is not intended to be a substitute. It should be regarded as a tool for the selection of the best therapeutic option for the specific patient and also for pretherapeutic stratification of risk factors in the setting of new randomised clinical trials.

Gastric malignancies

Gastric cancer continues to be a significant health problem around the world. It is one of the leading causes of cancer death and most common malignancy among men and the second most common among

women worldwide. In countries other than Japan, the presentation of gastric cancer is usually late and the overall prognosis of the disease is poor.

Primary carcinoma of the stomach can be cured by surgical resection if it is found early. The first priority of surgery for gastric cancer must be to resect the entire primary tumour such that there is no macroscopic or microscopic tumour remaining. Unfortunately, these tumours often have spread by the time the diagnosis is made.

Staging workup in gastric carcinoma is based mainly on the anatomic extent of the disease, such as serosal infiltration, lymph node metastases, peritoneal seeding, ascites, and the presence of liver metastases. Evaluation of surgery and other treatments depends on accurate staging of tumour, associated lymph nodes, and distant metastases.

A more accurate preoperative staging allows a better prepared setting to avoid unnecessary laparotomy, to decide preoperative neoadjuvant chemotherapy, and to prepare the operation for combined resections or intraoperative radiotherapy. Preoperative ultrasonography & CT scanning have been shown to be poor predictors of resectability in patients with gastric cancers.

Because of the inaccuracy of CT and other modalities for the detection of macro metastases smaller than 5mm on the peritoneal surface or liver, laparoscopy is recommended as next step in evaluation of patients with locoregional disease.

Many authors, therefore, have advocated the use of diagnostic laparoscopy in addition to noninvasive modalities to assess these patients for metastatic disease.

Some reasons advocate the staging laparoscopy in gastric cancer treatment.

- Because of the natural progression of this disease the risk of finding peritoneal implants (M1 disease) at the time of laparotomy is 25-37% after an otherwise, unremarkable CT scan.
- Considering the fact that few patients with M1 disease actually develop surgical bleeding or significant gastric outlet obstruction prior to death a strong argument can be made for laparoscoping all patients with advanced gastric cancer.
- Moreover in order to select patients that will most likely benefit from
- neoadjuvant treatment, distant metastases must be ruled out preoperatively.

In the neoadjuvant treatment setting, staging must correctly identify

(1) Incurable tumours with distant metastatic disease and

(2) High-risk tumours with serosal infiltration.

Surgical laparoscopy offers high accuracy for detecting intraabdominal small metastases. Laparoscopic inspection is better than macroscopic examination under open laparotomy for several reasons. The subphrenic space and Douglas pouch, where peritoneal metastases is frequently observed but direct observation under laparotomy misses small metastatic nodules, can be observed by laparoscopy depending on the magnifying power. Therefore, staging laparoscopy should be performed for patients at high risk for peritoneal metastases, such as patients with type 4 tumours, undifferentiated tumours, or tumours in more than two regions.

Several studies showed that preoperative chemotherapy induced down-staging of the disease and resulted in a higher curative resection rate for surgically staged unresectable cancer. Accurate staging is necessary in advanced cases not only to decide on neoadjuvant treatment but also on whether to proceed with salvage surgery after neoadjuvant treatment. A second staging laparoscopy effectively determined whether patients should undergo salvage surgery after

neoadjuvant therapy, especially in cases where peritoneal metastases was the only reason for noncurability.

Over the last 2–3 decades, reports have highlighted the role of diagnostic laparoscopy in the early detection of gastric cancer. The technical refinement of the laparoscope over the past decade and the enhancement of technique made laparoscopy the ideal tool for the absolute diagnosis and staging of malignancy.

Primary Hepatic Tumours

The use of SL has been advocated to select patients with hepatocellular carcinoma for resection. The literature evaluation of SL for hepatocellular carcinoma is not as extensive as for other malignancies. Recent reports have suggested that laparoscopy has much to offer in the staging of primary and secondary liver tumours Despite a sophisticated diagnostic armamentarium which includes duplex ultrasonography, computerized tomography(contrast-enhanced, portography), magnetic resonance imaging, and selective visceral angiography, 40%-70% of hepatic tumours are found to be unresectable at the time of open exploration.

Peritoneal spread is relatively rare in hepatocellular carcinoma, however, the risks of laparotomy in patients with altered liver function

subject to postoperative ascites should be considered as increasing the potential benefit of SL.

In addition to tumour assessment, SL in patients with hepatocellular carcinoma provides a minimally invasive assessment of the severity of cirrhosis and the size of the liver remnant which is critical for the assessment of resectability. Similar to pancreatic cancer, operative resection in hepatobiliary malignancy is associated with improved survival only in selected patients in which complete tumour resection can be performed with an adequate hepatic remnant for recovery. The presence of sub-radiographic metastatic disease is also of concern in certain patients with hepatobiliary malignancy.

Considerable controversy currently exists as to the criteria for resectability of liver tumours. In many centers, the presence of extrahepatic tumour spread, multifocal or bilobar disease, or the presence of significant cirrhosis constitute absolute contraindications for curative resection. In other centers, these factors are considered relative criteria. Thus, the impact of a staging modality such as laparoscopy is difficult to ascertain from the literature. Nonetheless, some insight on the efficacy of laparoscopy in diagnosing and staging hepatic tumours and avoiding unnecessary open exploration in those patients with advanced disease can be obtained from published data.

The role of diagnostic laparoscopy and liver biopsy in the diagnosis and staging of cancer deserves special mention. Patients suspected of having hepatic malignancy should have screening radiological investigations before proceeding to diagnostic laparoscopy.

However, the sensitivity of radiological investigations is low in the diagnosis of peritoneal metastases originating from hepatic neoplasms. Two studies from the same centre identified 21% and 48% of patients with negative CT scans as having peritoneal metastases at laparoscopy. In these cases, diagnostic laparoscopy avoided the necessity for laparotomy.

Treatment of hepatocellular carcinoma (HCC) by surgical resection is generally precluded by background cirrhosis, peritoneal metastases and multi-focal disease; all of which may be assessed by laparoscopy.

In a study by D'Angelica et al of 410 patients with radiographically resectable hepatobiliary malignancy, SL was completed in 73% of patients and, in 84 (55%) of the 153 evaluated patients, SL identified disease that precluded resection. In this group of patients, SL was valuable in identifying unsuspected cirrhosis, peritoneal disease and additional hepatic tumours but it commonly failed to identify extra-regional lymph node metastases and vascular invasion.

Lo et al reported that SL and laparoscopic ultrasonography allowed for the avoidance of laparotomy in 63% of patients with unresectable disease. In their experience, the accuracy of SL was decreased in tumours > 10 cm and in the evaluation of tumour thrombi in major vascular structure and/or the invasion of adjacent organs. In patients who were spared laparotomy, a faster postoperative recovery and an earlier initiation of nonoperative treatment was observed and the authors suggest that the procedure should be performed routinely before laparotomy for hepatocellular carcinoma.

Staging laparoscopy has recently been employed as a staging tool in HCC and spares about one in five patients a nontherapeutic laparotomy. Laparoscopy yields additional information about extent of disease in the liver, extrahepatic disease, and cirrhosis. The yield of laparoscopy is dictated by the extent of disease and is only selectively employed. The presence of clinically apparent cirrhosis, radiologic evidence of vascular invasion, or bilobar tumours increased the yield to 30%, whereas without these factors, the yield is 5%.

Biliary Tract Tumours

Patients with malignancies of the biliary tract have a dismal prognosis. As in most abdominal cancers, resection is the only effective

treatment with potential for cure. Preoperative staging is not completely accurate, however, and a significant number of patients with biliary carcinoma undergo unnecessary laparotomy. As imaging technology improves, more patients with unresectable disease will be identified, avoiding the need for a laparotomy. Laparoscopy is a major addition, but its usefulness in staging of abdominal malignancies continues to evolve.

Hilar cholangiocarcinoma and gallbladder carcinoma are aggressive malignancies, with a median survival for patients with unresectable disease of 11 months and 5 months, respectively. Unfortunately, even after extensive preoperative evaluation, occult unresectable disease is discovered at the time of exploratory laparotomy in many patients. Because of the recovery time required after major laparotomy and the limited median survival in patients with unresectable disease, many centers have been evaluating the role of staging laparoscopy.

Even after extensive preoperative imaging, many patients are found to have either unresectable, locally advanced tumours or metastatic disease at laparotomy. After thorough preoperative imaging, only 50% to 75% of patients who undergo exploration are amenable to a potentially curative resection.

Preoperative assessment of respectability of biliary tract tumours is challenging since, in addition to metastatic spread, the resectability of a given tumour is predicated on hilar vascular and biliary involvement which is often not accurately assessed by preoperative imaging. Despite extensive preoperative evaluation, less than half of patients who undergo exploration are amenable to a potentially curative resection and the issue of respectability is usually resolved at laparotomy, often after an extensive dissection of the portal vascular and biliary structures.

Because early carcinoma of the gallbladder causes no specific signs or symptoms, most patients with this disease are diagnosed with advanced-stage tumours. Resection remains the most effective therapy for patients with extrahepatic biliary cancer. However, because many patients present late in the course of the disease, resection is often not possible.

Tumours were considered unresectable if any of the following conditions were present before surgery or at laparoscopy or laparotomy: peritoneal metastases; discontiguous intrahepatic metastases; involved lymph nodes in the periduodenal, retropancreatic, common hepatic, or celiac nodal basin; locally advanced disease secondary to main portal vein encasement or tumour extension to second-order biliary radicles

bilaterally; or unilateral tumour extension to secondary biliary radicles with contralateral lobar atrophy or contralateral portal vein involvement.

In patients with gallbladder cancer, the yield of laparoscopy was highest in those not subjected to prior cholecystectomy. More than half the patients with primary gallbladder cancer benefited from staging laparoscopy, supporting its routine use in this subgroup. Patients undergoing reexploration after initial cholecystectomy represent a more difficult problem.

The advantages of detecting unresectable disease at laparoscopy include not only the shortened recovery time and improved quality of life(decreased morbidity and pain), but also the potentially shorter time to initiation of nonoperative therapy.

In summary, patients with hilar cholangiocarcinoma and gallbladder cancer frequently have unresectable disease that is not apparent on preoperative imaging studies. Laparoscopy correctly identifies unresectable disease and prevents unnecessary laparotomy in one third of patients. Patients with unresectable disease that is not detected at laparoscopy most often have locally advanced tumours. Patients with primary gallbladder cancer and patients with T2/T3 hilar cholangiocarcinoma should undergo staging laparoscopy before laparotomy.

Regarding the differential use of SL in cholangiocarcinoma and gallbladder cancer, most of the authors observed a higher yield of SL in gallbladder cancer. This is likely due to a more frequent early dissemination in gallbladder cancer.

Staging laparoscopy should be performed in patients with gallbladder cancer, as high proportions(50-55%) of patients have hepatic or extrahepatic disease that is not detected by noninvasive staging modalities.

Colorectal cancers

SL is primarily not used in colorectal cancers . The indication for SL is to prevent bleeding obstruction and perforation. In case of primary colorectal cancers with liver metastasis, curative resection can be done when there is no extra hepatic involvement and it is possible to resect the disease in liver.

Diagnostic laproscopy can detect any liver mets, any extra hepatic involvement and thereby reducing the unnecessary laprotomies. SL may decrease the duration of hospital stay , cost of treatment and early adjuvant theraphy when compared to open laprotomies.

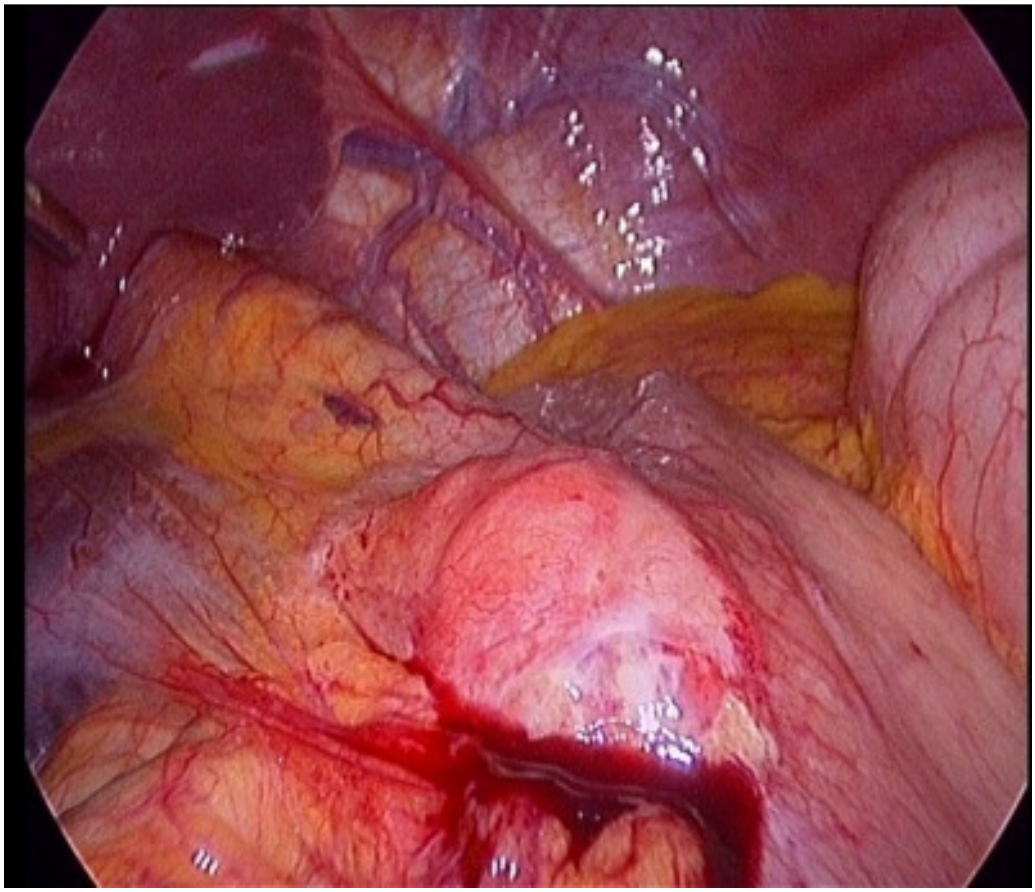
The benefit of SL can be assessed with Clinical Risk Score (CRS) System .It includes five criteria and each carries one point.

1. Lymph node positive colon cancers
2. Disease free interval less than 12 months
3. More than one hepatic tumour
4. Size of largest hepatic tumour greater than 5 cm
5. CEA greater than 200 ng/ml within one month of surgery

The yield of SL is higher if CRS>2

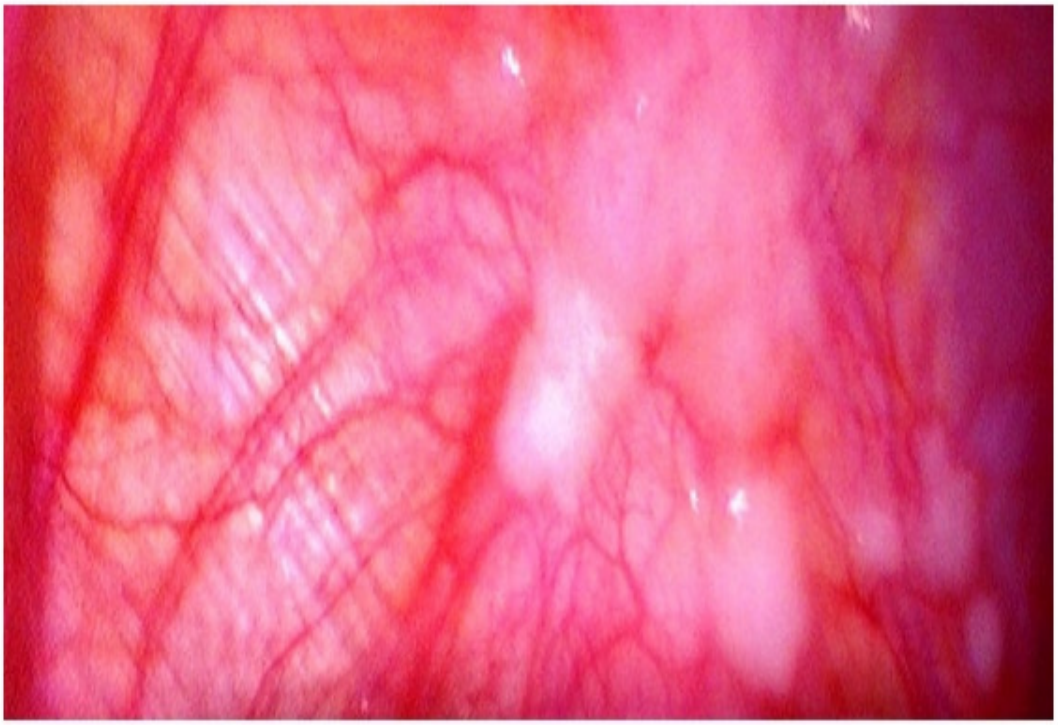
In patients with colorectal cancers with hepatic metastasis staging laproscopy can be safely performed. The cost and duration of treatment can be reduced if early curative laprotomy and resection is done when SL is negative for metastatic disease.

Colonic carcinoma

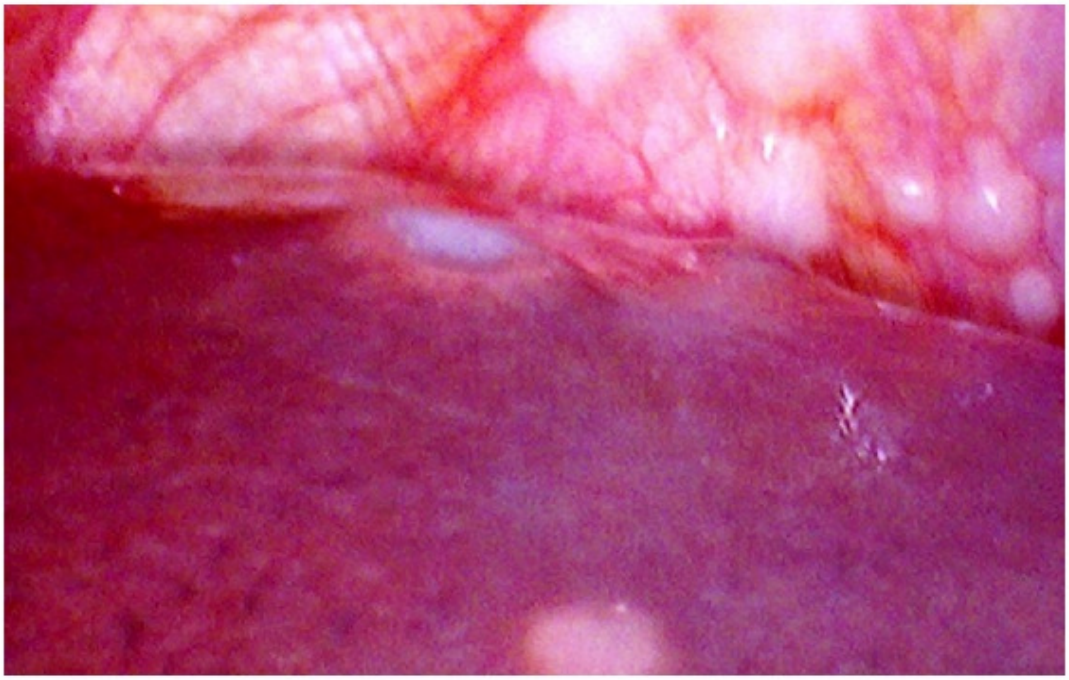


Peritoneal deposits

Peritoneal Metastasis



Liver Metastasis



MATERIALS AND METHODS

AIMS & OBJECTIVES:

Diagnostic laparoscopy helps in diagnosing and staging Gastrointestinal (GI) cancers. Routine laparoscopy before laparotomy, especially in cancers that have equivocal operability, helps to avoid unnecessary laparotomies.

Present study evaluates utility of laparoscopy in diagnosing and staging GI cancers.

PLACE OF STUDY:

DEPARTMENT OF GENERAL SURGERY, STANLEY MEDICAL COLLEGE AND HOSPITAL

DURATION:

JAN 2013 TO DEC 2013

STUDY DESIGN:

PROSPECTIVE STUDY

PATIENT SELECTION:

Patients who have been clinically and radiologically diagnosed as gastrointestinal malignancies

EXCLUSION CRITERIA:

1. Patient not willing to get the investigations done
2. Patient who are not fit for performing laproscopy
3. Hemodyanamic instability
4. Uncorrected coagulopathy
5. Multiple previous abdominal procedures

METHODOLOGY:

Patients admitted in our hospital with clinical diagnosis from jan 2013 to 2013 dec 2013 will be enrolled in our study.

A detailed history taking followed by full clinical examination and basic blood investigations

Patients are subjected to ultrasonogram and cectand biopsy proven malignancy in department .

Findings interpreted, patients subjected to surgery based on clinical scenario

This study contains 30 patients, 13 males and 17 females. A detailed history of patient was taken. The hospital records were reviewed to obtain information regarding age, sex, occupation, date of admission and discharge, operative date and clinical investigation

Diagnostic Laparoscopy was performed and details were noted. According to the observations in SL patients were subjected to further course of management. Patients were also followed to known complications, convalescence & hospital cost.

Examination

All patients with abdominal malignancies were examined thoroughly and the findings were recorded.

In all patients with abdominal malignancies complete general physical examination, local examination and systemic examination was done. All these were examined by inspection, palpation, percussion and auscultation.

Investigations:

In patients with abdominal malignancies we undertook following investigations as required :

Haemotological – Hb%, TC, DC, ESR.

Biochemical - RBS, Blood urea, Serum creatinine, Serum electrolytes, LFT Radiological – Chest X- ray, X-ray erect abdomen, ultrasound abdomen and pelvis, Upper GI endoscopy, lower GI endoscopy and CT scan wherever applicable.

Laparoscopy

After complete workup and investigations clinical diagnosis ascertained, radiological help obtained wherever possible and patients were considered for diagnostic laparoscopy. All patients were informed of the risks and benefits of the procedure and also explained about the probability of laparotomy if need arose and for the definitive procedure when required.

After creating the pneumoperitoneum using veress needle or blind trocar insertion method 10 mm telescope was placed through the supra / subumbilical port, another 5 mm port was placed in the upper or lower abdomen to allow manipulation or biopsy of intraabdominal pathology.

A thorough evaluation of peritoneal cavity, was made and wherever required biopsy was taken. Subsequently thorough staging was done wherever feasible a therapeutic procedure was also performed by laparoscopy.

If the condition did not require any intervention nothing else was done.

The operative time represented the total time is in minutes from insertion of the first trocar insertion to completion of staging procedure. Convalescence period was determined from day of surgery to discharge

or expiry. Complications were determined intraoperatively and post operatively, morbidity in respect to wound sepsis (surgical site infection), respiratory distress etc.

Mortality if any, were recorded.

STATISTICAL METHODS APPLIED

Descriptives

The Descriptives procedure displays univariate summary statistics for several variables in a single table and calculates standardized values (z scores). Variables can be ordered by the size of their means (in ascending or descending order), alphabetically, or by the order in which you select the variables (the default).

Frequencies

The Frequencies procedure provides statistics and graphical displays that are useful for describing many types of variables. For a first look at your data, the Frequencies procedure is a good place to start.

Crosstabs

The Crosstabs procedure forms two-way and multiway tables and provides a variety of tests and measures of association for two-way tables. The structure of the table and whether categories are ordered determine what test or measure to use.

Independent-Samples T Test

The Independent-Samples T Test procedure compares means for two groups of cases. Ideally, for this test, the subjects should be randomly assigned to two groups, so that any difference in response is due to the treatment (or lack of treatment) and not to other factors.

One sample T test

The One Sample T Test procedure tests whether the mean of a single variable differs from a specified constant.

All the statistical methods were carried out through the SPSS for Windows (version16.0).

RESULTS

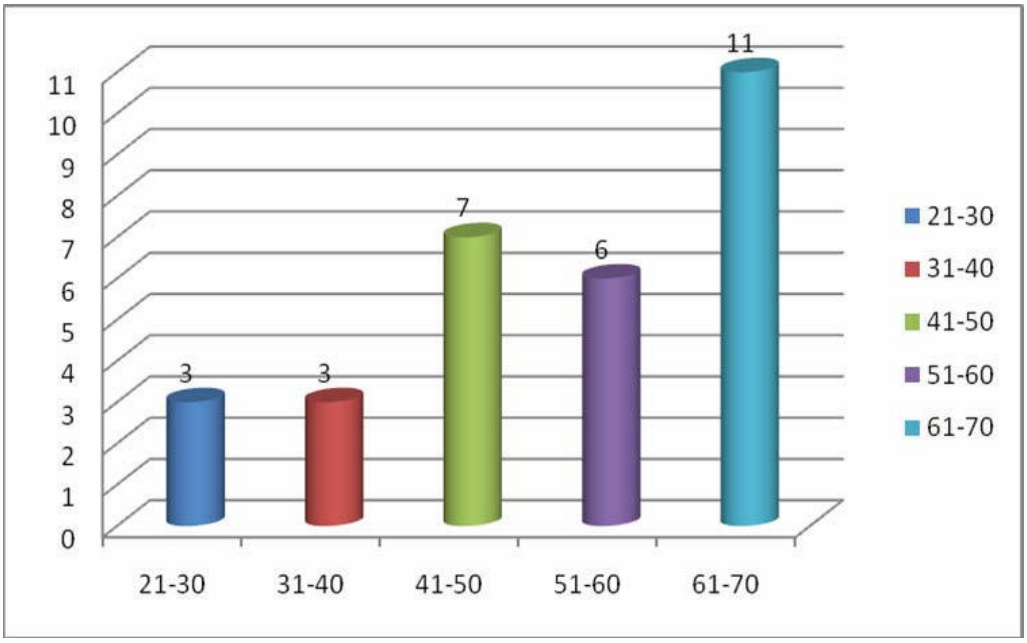
During 1 years of study period from January2013 to December 2013 a total of 30 new cases of abdominal malignancies underwent Diagnostic laparoscopy after thorough clinical evaluation and appropriate radiological & histological investigations.

TABLE 1. AGE & SEX DISTRIBUTION

Age group in years	Male	Female	Total	Percentage %
21-30	1	2	3	10
31-40	1	2	3	10
41-50	2	5	7	23.3
51-60	5	1	6	20
61-70	4	7	11	36.7
Total	13	17	30	100

CC= 0.378; P= 0.288 (NS)

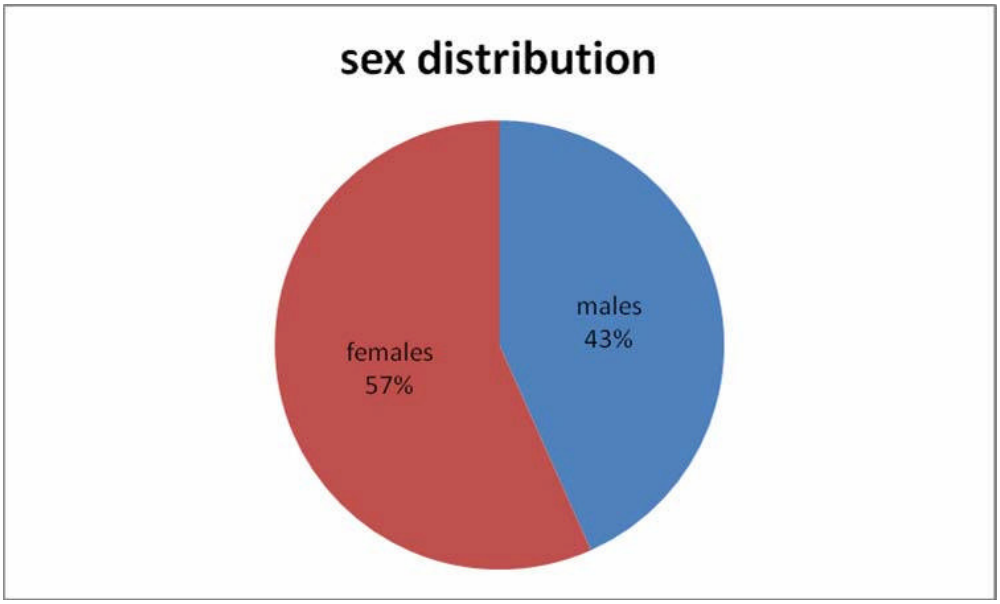
GRAPH 1. AGE DISTRIBUTION



The age group with maximum number of cases was the 61-70 age group followed by 41-50 age group and then by 51-60 age group. Mean age for group being 53years

There were 13 Male & 17 Female patients in the study which is comparable.

GRAPH 2. SEX WISE DISTRIBUTION



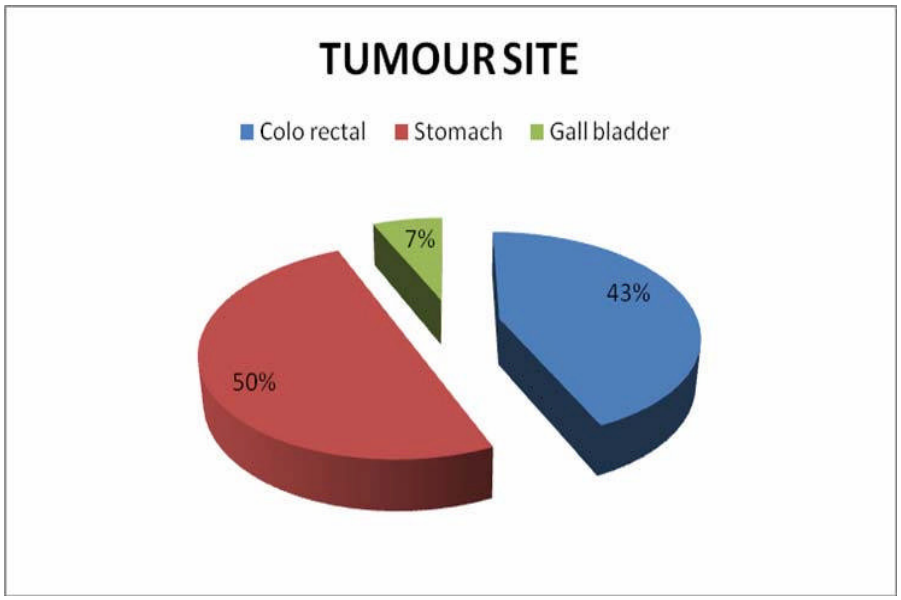
The youngest male patient was of 21 years & the oldest 70 years of age, the mean age of male patients being 53.4 years.

The youngest female patient was of 26 years & the oldest 70 years of age, the mean age of female patients being 52.6 years.

TABLE 2. DISTRIBUTION OF CASES ACCORDING TO TUMOUR SITE

Tumour site	No. of Patients	Percent
Colorectal	13	43.3%
Stomach	15	50.0%
Gall Bladder	2	6.7%

GRAPH 3. TUMOUR SITE



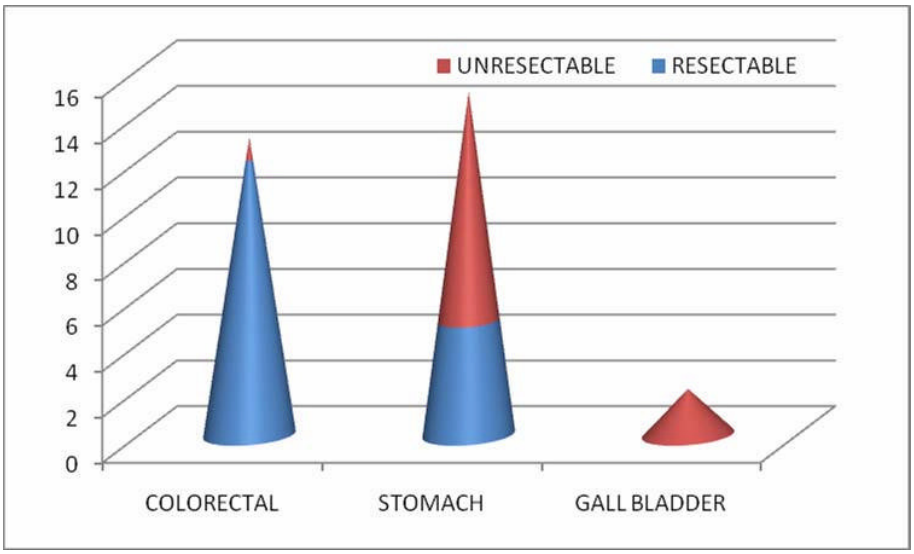
Stomach malignancies constituted 15 (50%) cases of the study cases followed by Colorectal which constituted 13(43%) and rest by Gall bladder malignancies 2(7%) cases of the study.

TABLE 3. RESECTABILITY ACCORDING TO THE TUMOUR SITE

	SITE			TOTAL
	COLORECTAL	STOMACH	GALL BLADDER	
RESECTABLE	12 (92.3%)	5 (33.3%)	0 (0%)	17 (56.7%)
UNRESECTABLE	1 (7.7%)	10 (66.7%)	2 (100%)	13 (43.3%)
TOTAL	13	152		30

CC= 0.545; P= 0.002 (S)

GRAPH 4. RESECTABILITY ACCORDING TO TUMOUR SITE



There were 2 cases of Gall bladder malignancies and both of them were unresectable.

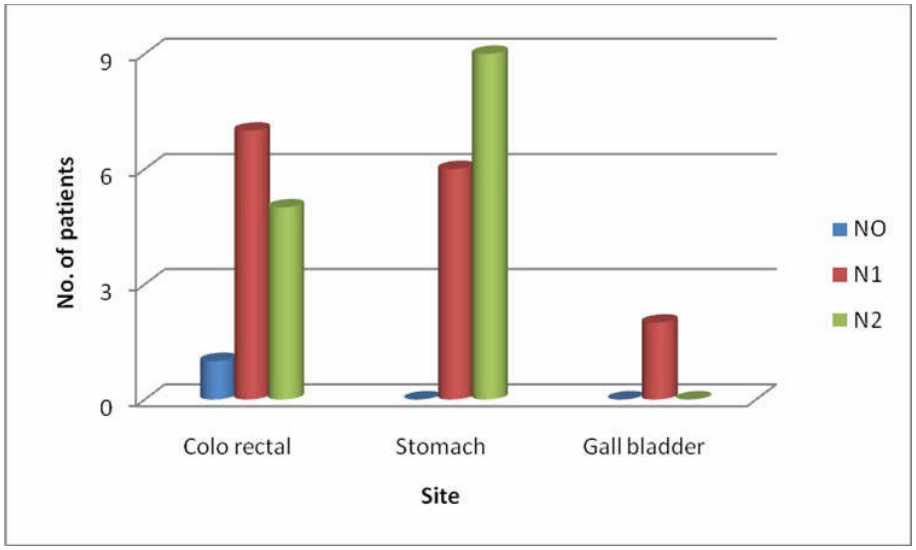
There were 15 cases of Stomach malignancies out of which 10 (66.7%) were unresectable. Out of 13 cases of colorectal malignancies only 1(7.7%) was found to be unresectable.

Table 4. LYMPH NODE STATUS ON STAGING LAPAROSCOPY

			site			
			Colorectal	Stomach	Gall bladder	Total
LYMPH	N0	Count	1	0	0	1
		% SITE	7.7%	0%	0%	3.3%
	N1	Count	7%	6	2	15
		% SITE	53.8%	40.0%	100.0%	50.0%
	N2	Count	5	9%	0	14
		% SITE	38.5%	60.0%	0%	46.7%
	N3	Count	13	15	2	30
		% SITE	100%	100.0%	100.0%	100.0%

CC= 0.545; P= 0.002 (S)

GRAPH 5. LYMPH NODE STATUS ON STAGING LAPAROSCOPY



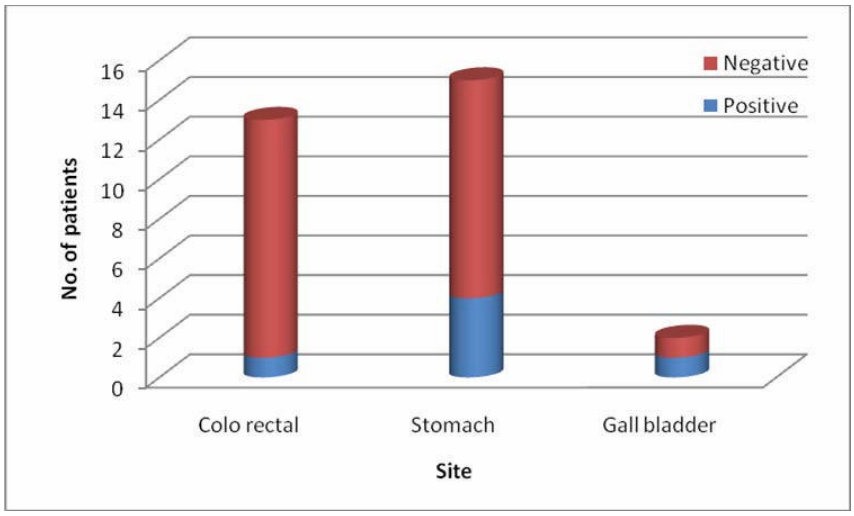
In half of the cases there were N1 level lymph nodes and 14 cases(46.7%) having N2 level lymph nodes. Only 1 case had N0 lymph node status seen in colorectal malignancy.

Table 5. LIVER METASTASES ON STAGING LAPAROSCOPY

			site			
			Colorectal	Stomach	Gall bladder	Total
LYMPH	N0	Count	12	11	1	24
		% within SITE	92.3%	73.3%	50.0%	80.0%
	N1	Count	1%	4	1	6
		% within SITE	7.7%	26.7%	50.0%	20.0%
	N2	Count	13	15	2	30
		% within SITE	100%	100.0%	100.0%	100.0%

CC= 0.291; P= 0.250 (NS)

GRAPH 6. LIVER METASTASES ON STAGING LAPAROSCOPY



Only 6 cases(20.0%) had liver metastases found on staging laparoscopy. Out of 6 cases, 4 cases were from stomach malignancy and only 1 each from colorectal & gall bladder malignancy.

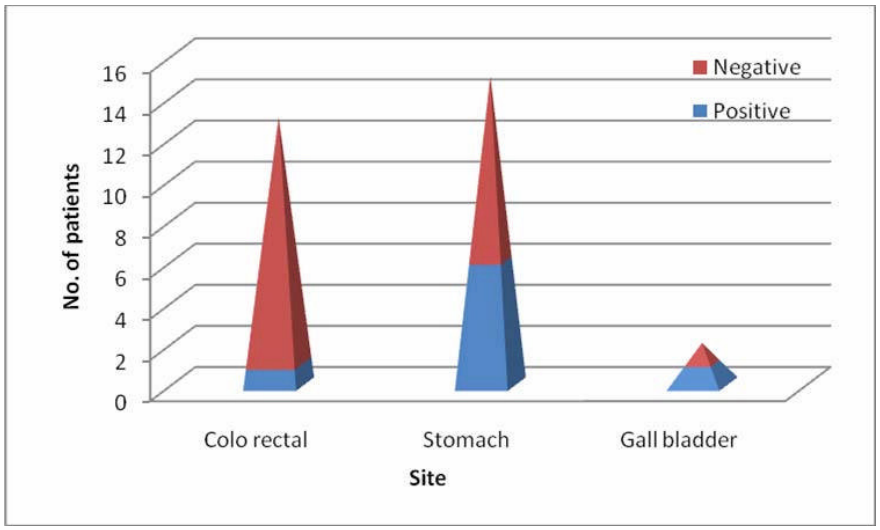
Rest 24 cases had no hepatic metastases on staging laparoscopy.

Table 6. LYMPH NODE STATUS ON STAGING LAPAROSCOPY

			site			
			Colorectal	Stomach	Gall bladder	Total
PERITO	Negative	Count	12	9	1	22
		% within SITE	92.3%	60.0%	50.0%	73.3%
	Positive	Count	1	6	1	8
		% within SITE	7.7%	40.0%	50.0%	26.7%
Total		Count	13	15	2	30
		% within SITE	100.0%	100.0%	100.0%	100.0%

CC= 0.545; P= 0.002 (S)

GRAPH 7. PERITONEAL NODULES ON STAGING LAPAROSCOPY



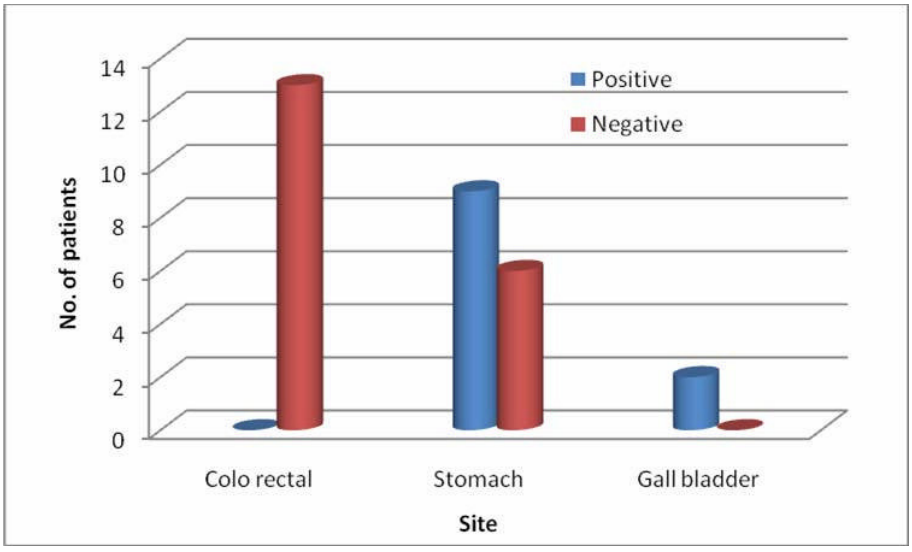
Totally out of 30 cases, 8 cases (26.7%) had peritoneal nodules on staging laparoscopy. Most no. of cases were from stomach constituting 6 cases and other cases were from colorectal & gall bladder which constituted 1 each.

Table 7. OMENTAL NODULES ON STAGING LAPOROSCOPY

			site			
			Colorectal	Stomach	Gall bladder	Total
PERITO	Negative	Count	13	6	0	19
		% within SITE	100.0%	40.0%	0%	63.3%
	Positive	Count	0	9	2	11
		% within SITE	0%	60.0%	100.0%	36.7%
Total		Count	13	15	2	30
		% within SITE	100.0%	100.0%	100.0%	100.0%

CC= 0.579; P= 0.004 (S)

GRAPH 8. OMENTAL NODULES ON STAGING LAPAROSCOPY



Omental nodules are seen in 11 (36.7%) cases out of total 30.

Stomach malignancies resulted in 9 (60.0%) cases of omental malignancies out of 15 cases. Both the cases of Gall bladder malignancies had omental nodules.

No cases of colorectal malignancies had omental nodules.

Table 8. ASCITES ON STAGING LAPAROSCOPY

			site			
			Colorectal	Stomach	Gall bladder	Total
ASCITIC	Negative	Count	10	8	1	19
		% within SITE	76.9%	53.3%	50.0%	63.3%
	Positive	Count	3	7	1	11
		% within SITE	23.1%	46.7%	50.0%	36.7%
Total		Count	13	15	2	30
		% within SITE	100.0%	100.0%	100.0%	100.0%

CC= 0.240; P= 0.400 (NS)

ASCITES ON STAGING LAPAROSCOPY

Ascites was present in 11 (36.7%) case while absent in 19 (63.3%) cases. 7 out of 15 cases of stomach malignancies had ascertic on staging laparscopy while only 3 out of 13 cases of colorectal malignancies had ascites present.

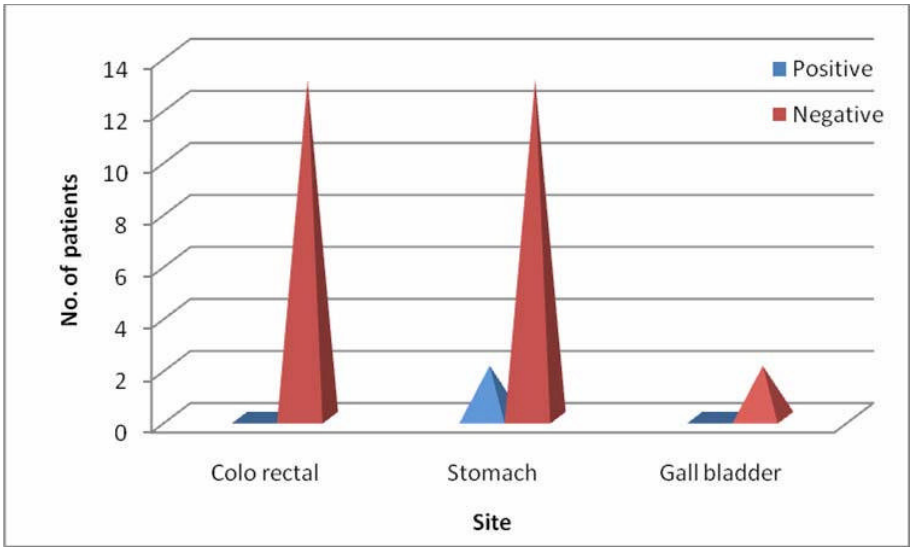
1 out of 2 patients of Gall bladder malignancies had ascites.

Table 9. MENSENTRIC NODULES ON STAGING LAPAROSCOPY

			site			
			Colorectal	Stomach	Gall bladder	Total
MESENTRIC	Negative	Count	13	13	2	28
		% within SITE	100%	86.7%	100.0%	93.3%
	Positive	Count	0	2	0	2
		% within SITE	0%	13.3%	0%	6.7%
Total		Count	13	15	2	30
		% within SITE	100%	100.0%	100.0%	100.0%

CC= 0.258; P= 0.343 (NS)

GRAPH 10. MESENTRIC NODULES ON STAGING LAPAROSCOPY



Only 2 (6.7%) cases had mesenteric nodule on staging laparoscopy and both the cases had stomach malignancies. No cases of Colorectal or Gall bladder malignancy had mesentric nodules on staging laparoscopy.

Table 10. PELVIC METASTASES ON STAGING LAPAROSCOPY

			site			
			Colorectal	Stomach	Gall bladder	Total
MESENTRIC	Negative	Count	11	14	2	27
		% within SITE	84.6%	93.3%	100.0%	90.0%
	Positive	Count	2	1	0	3
		% within SITE	15.4%	6.7%	0%	10.0%
Total		Count	13	15	2	30
		% within SITE	100.0%	100.0%	100.0%	100.0%

CC= 0.164 ; P= 0.662 (NS)

PELVIC METASTASES ON STAGING LAPAROSCOPY

Pelvic metastases were found in only 3 (10%) cases and rest of the cases it was normal.

2 cases of colorectal malignancy had pelvic metastases.

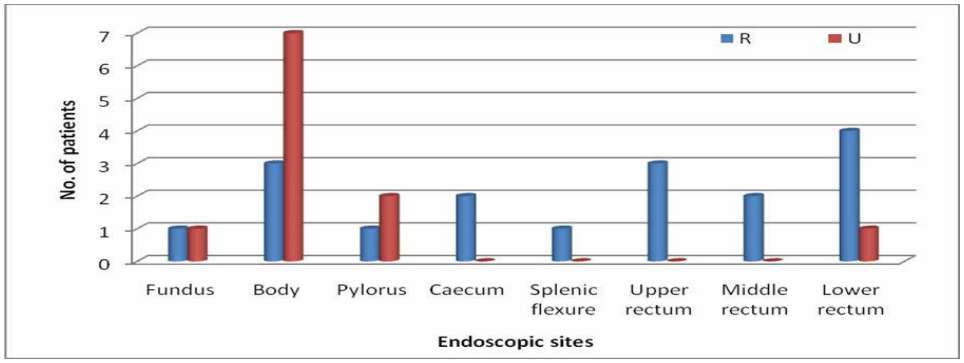
1 case of stomach malignancy had bilateral ovarian secondaries (Krukenberg's tomour) found at staging laparoscopy. No pelvic metastases seen in gall bladder malignancies.

Table 11. RESECTABILITY ACC TO ENDOSCOPIC SITE OF TUMOUR

	ENDOSCOPIC SITES								Total
	Fundus	Body	Pylorus	Caecum	Splenic flexure	Upper rectum	Middle rectum	Lower rectum	
Laparosopi R	1	3	1	2	1	3	2	4	17
C Staging									
	50.0%	30.0%	33.3%	100.0%	100.0%	100.0%	100.0%	80.0%	60.7%
U	1	7	2	0	0	0	0	1	11
	50.0%	70.0%	66.7%	0%	0%	0%	0%	20.0%	39.3%
Total	2	10	3	2	1	3	2	5	28
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

CC= 0.530; P= 0.141 (NS)

GRAPH 12. RESECTABILITY ACCORDING TO ENDOSCOPIC SITE OF TUMOUR



Tumours were subdivided according to endoscopic sites. It was done only in 28 cases excluding 2 cases of Gall bladder malignancy.

Out of total 15 cases of stomach malignancy - 10 cases had tumour in Body, 3 in pylorus & 2 in fundus of stomach. Totally there were 10 unresectable cases of stomach malignancy out of which 7 cases were in Body, 2 in pylorus & 1 case in fundus of stomach.

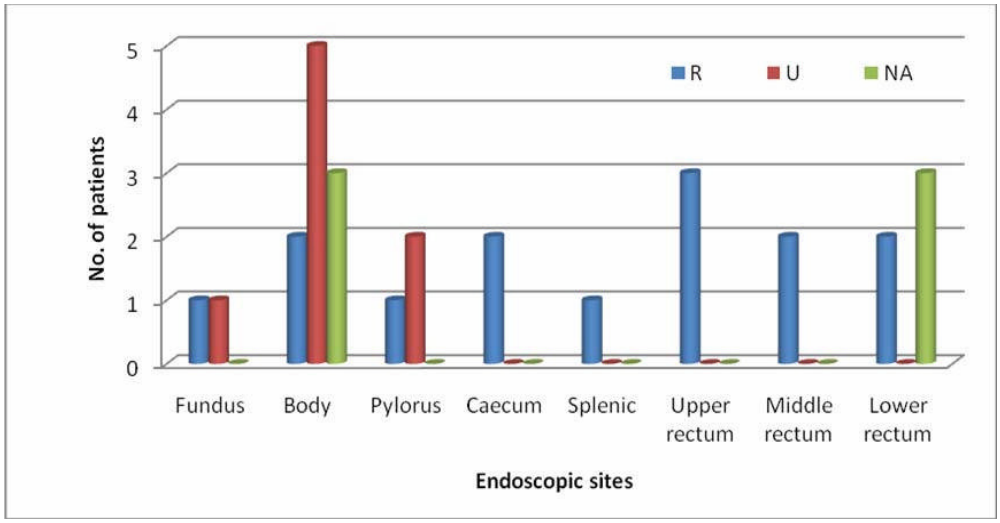
Out of total 13 cases of colorectal malignancy – 10 cases were in Rectum, 2 in Caecum and 1 case had tumour in splenic flexure. Further subdividing rectal tumour there were 5 cases in lower 1/3 , 3 in upper 1/3 and 2 were in middle 1/3 . Only 1 case of colorectal malignancy was unresectable which was in lower rectum.

Table 12. LAPAROTOMY STAGING ACC. TO ENDOSCOPIC SITE OF TUMOUR

	ENDOSCOPIC SITES								Total
	Fundus	Body	Pylorus	Caecum	Splenic flexure	Upper rectum	Middle rectum	Lower rectum	
Laparotomy R	1	2	1	2	1	3	2	2	14
C Staging									
	50.0%	20.0%	33.3%	100.0%	100.0%	100.0%	100.0%	60.0%	50.0%
U	1	5	2	0	0	0	0	0	8
	50.0%	50.0%	66.7%	0%	0%	0%	0%	0%	28.6%
N	0	3	0	0	0	0	0	3	6
A	0%	30.0%	0%	0%	0%	0%	0%	40.0%	22.4%
Total	2	10	3	2	1	3	2	5	28
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

CC= 0.620; P= 0.229 (NS)

GRAPH 13. LAPAROTOMY STAGING ACC. TO ENDOSCOPIC SITE OF TUMOUR



Totally there were 28 cases out of which 6 cases did not undergo laparotomy – 3 cases of stomach body tumour which were unresectable & 2 cases of lower rectal tumour which were resected laparoscopically & 1 case of lower rectal malignancy was found unresectable

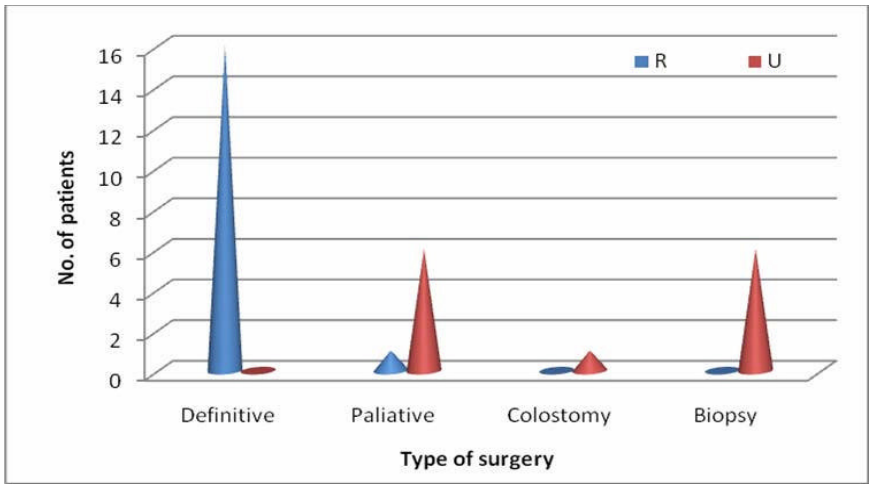
There were 14 resectable cases on laparotomy and 8 cases were found to be unresectable on staging laparoscopy.

Table 13. TYPE OF SURGERY PERFORMED

	LAPARSCOPIC STAGE			
PROCEDURE	RESECTABLE	UNRESECTABLE	TOTAL	PERCENT
DEFINITIVE	16(94.1%)	0(0%)	16	53.3%
PALLIATIVE	1 (5.9%)	6(46.2%)	7	23.4%
COLOSTOMY	0(0%)	1 (7.6%)	1	3.3%
BIOPSY	0(0%)	6(46.2%)	6	20.0%
TOTAL	17(100.0%)	13(100.0%)	30	100.0%

CC= 0.685; P= 0.000 (S)

GRAPH 13. LAPAROTOMY STAGING ACC. TO ENDOSCOPIC SITE OF TUMOUR



17 cases were found to resectable on Laparoscopic staging but only 16 underwent definitive procedure as 1 case of stomach body tumour was found to be unresectable on laparotomy and underwent only palliative procedure.

Totally 7 cases underwent Palliative procedure, 1 patient underwent colostomy and rest of 6 unresectable case undergone only laparoscopic biopsy for tissue diagnosis.

Thus 13(43.3%) cases out of 30 were prevented from undergoing unnecessary exploratory laparotomy

Table 14. DURATION OF STAGING LAPAROSCOPY

	LAPSTAGE	N	Mean	Std. Deviation
DURNLAP	R	17	17.3529	3.99908
	U	13	20.7692	5.71772

				t-test for Equality of Means	
		t	df	Sig.(2-tailed)	Mean Difference
DURNLAP	Equal variances assumed	-1.927	28	.064	-3.4163

Mean duration of Staging laparoscopy was 18.83 minutes.

Staging laparoscopy mean duration in resectable group was found to be 17.35 mins which was found to be lower than mean duration in unresectable group was 20.76mins.

Unresectable group had higher mean duration for staging laparoscopy as 6 cases required laparoscopic biopsy as only procedure.

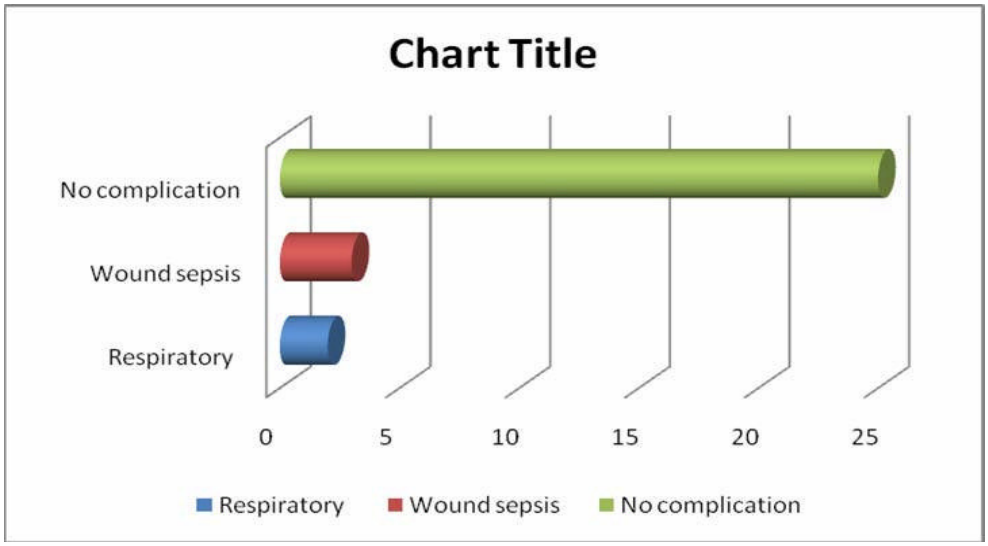
Difference between the mean duration for resectable & unresectable groups was not found to be statistically significant (P value = 0.064)

Table 15. COMPLICATIONS OF STAGING LAPAROSCOPY

	No. of Patients	Percent
Complications 5		16.7%
No. complication	25	83.3%
Total 30 100.0%		

Chi square value = 13.333 ; P=0.000 (S)

GRAPH 16. COMPLICATIONS OF STAGING LAPAROSCOPY



There were No complications in 25(83.7%) cases and only 5(16.7%) cases had complications. 3(10.0%)cases had minor complication of operative wound sepsis.

Only 2 (6.7%) cases had major respiratory complication.

There was No Mortality in the 30 study cases

Table 16. CONVALESCENCE PERIOD OF PATIENTS

	LAPSTAGE	N	Mean	Std. Deviation	Std. Error Mean
CONVAL	R	17	10.5882	2.80755	.68093
	U	13	5.0000	1.73205	.48038

		t-test for Equality of Means			
		T	Dt	Sig. (2- tailed)	Mean Difference
CONVAL	Equal variances assumed	6.303	28	.000	5.5882

Mean Convalescence period for the study group is 8.2days

Mean Convalescence period for Unresectable patients was found to be 5 days which was found to be significantly lower than Resectable group which was 10.58 days.

Table 17. COST EFFECTIVENESS

	LAPSTAGE	N	Mean	Std. Deviation	Std. Error Mean
COST	R	17	10388.235	2071.3054	502.36535
	U	13	7785.3846	3053.0384	846.76051

	t-test for Equality of Means				
		T	dt	Sig. (2- tailed)	Mean Difference
COST	Equal variances assumed	2.782	28	.010	2602.8507

Mean cost for study group was Rs.8897

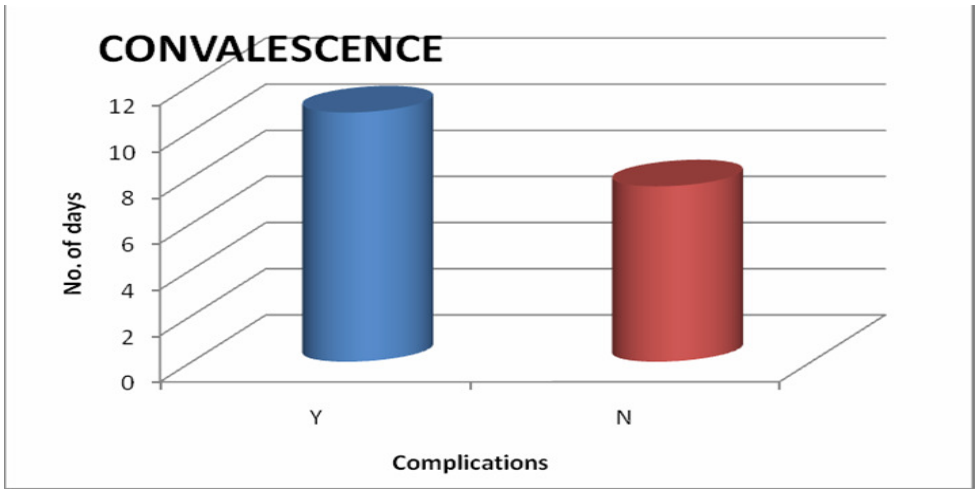
Mean cost for Unresectable group was Rs.7785 which was found to be significantly lower than Resectable group having mean cost of Rs.10388 (P=0.01).

Table 18. EFFECT OF COMPLICATIONS ON CONVALESCENCE & COST EFFECTIVENESS

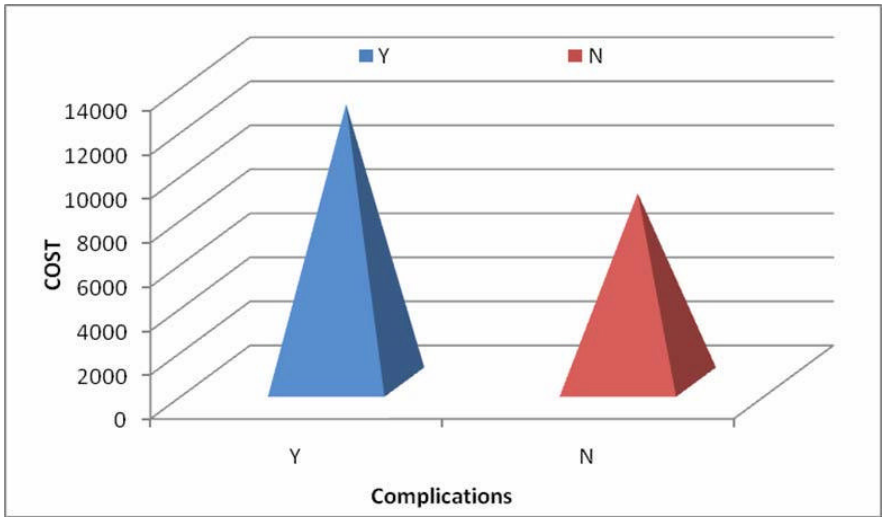
	COMPLI	N	Mean	Std. Deviation	Std. Error Mean
CONVAL	Y	5	10.8000	3.83406	1.71464
	N	25	7.6400	3.48664	.69733
COST	Y	5	12630.000	2896.12672	1295.187
	N	25	8586.4000	2315.95216	463.1904

	t-test for Equality of Means			
	T	dt	Sig. (2- tailed)	Mean Difference
CONVAL	1.823	28	.079	3.1600
COST	3.429	28	.002	4043.6000

GRAPH 19. EFFECT OF COMPLICATIONS ON CONVALESCENCE



GRAPH 20. EFFECT OF COMPLICATIONS ON COST EFFECTIVENESS



Convalescence period for patient having complications was higher than patients without complication (10.8 vs 7.6days) which was not found to be statistically significant.

Cost for patient having complications was also higher than patients without complication (12630 vs 8586) which was found to be statistically significant.

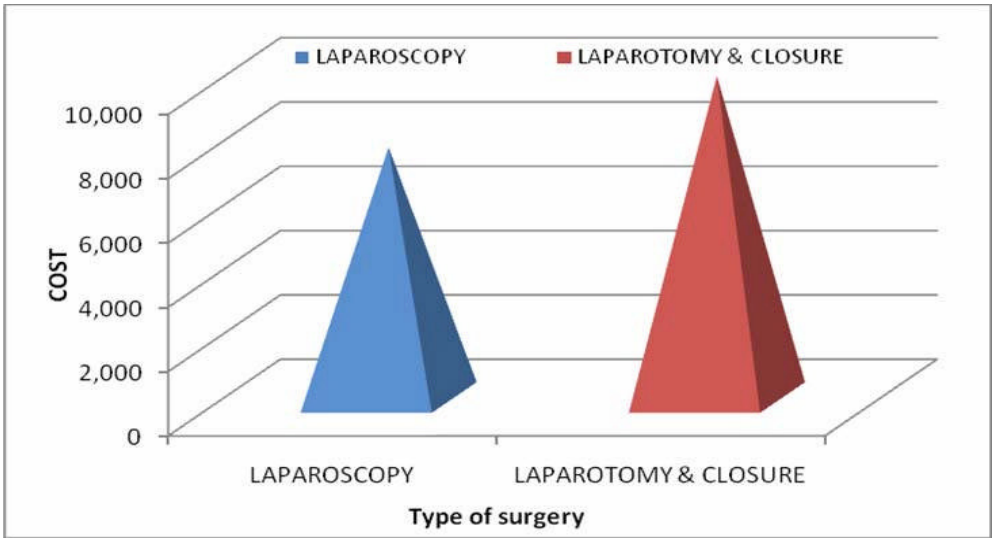
Table 19. CONVALESCENCE OF STUDY GROUP VS LAPAROTOMY & CLOSURE IN HOSPITAL

	N	Mean	Std. Deviation	Std. Error Mean
CONVAL	13	5.0000	1.73205	.48038
	Test Value = 8			
	T	Df	Sig. (2-tailed)	Mean Difference
CONVAL	-6.245	12	.000	-3.0000

Table 20. COST EFFECTIVENESS OF STUDY GROUP VS LAPAROTOMY & CLOSURE IN HOSPITAL

	N	Mean	Std. Deviation	Std. Error Mean
CONVAL	13	7785.3846	3053.03842	846.76051
	Test Value = 10000			
	T	df	Sig. (2-tailed)	Mean Difference
CONVAL	-2.615	12	.023	-2214.6154

Table 22. COST EFFECTIVENESS OF STUDY GROUP VS LAPAROTOMY & CLOSURE IN HOSPITAL



Mean Convalescence period and Cost for Unresectable group was compared for laparoscopic group & laparotomy and closure group in our hospital.

Mean Convalescence period for laparoscopic group was found to be very significantly lower compared to laparotomy group in our hospital (5 vs 8days; P value= 0.000)

Mean Cost for laparoscopic group was also found to be significantly lower compared to laparotomy group in our hospital (7785 vs 10,000; P value = 0.023).

DISCUSSION

Our aim of the study is to study the role of diagnostic laparoscopy for staging in abdominal malignancies.

In our study 30 cases of abdominal malignancies admitted in Stanley Medical College Hospital during the study period i.e. JAN 2013 to DEC 2013 were included

Diagnostic laparoscopy was performed in each patient immediately before the planned elective surgery. It resulted in change in further course of management of significant number of patients and was associated with less morbidity.

Age and sex incidence:

Out of 30 cases studied 13 were male patients and 17 were female patients constituting 43.3% and 56.7% respectively.

Patients ranged from 21 years to 70 years with mean age being 53 years.

Maximum number of patients in our study were in age group 61-70 followed by 41-50 and 51 – 60 years. Abdominal malignancies show increasing trend with age. It is similar to that seen in other studies.

Ozmen MM et al study comprised 48 patients ranging from 26 – 72 years (mean 54.5) with 26 males and 22 females. Hemming AW et al study comprised 162 patients with patients ranging from 28 to89 years (mean 67 years) and male to female ratio of 3:2. Lehnert T et al study comprised 120 patients ranging from 30 – 84 years (mean 65 years) with 78 males &42 females.

Age group studied was found to be in accordance to other studies.

Tumour site :

Study group had 30 cases comprising 15 (50.0%) cases of stomach tumour, 13 (43.3%) cases of colorectal & 2 (6.7%) cases of biliary tract tumours.

Muntean V et al study comprised 119 cases with 6 primary locations studied. Stomach tumours were 45 (37.8%), 20 (16.8%)cases of colon tumour and only 4 cases of biliary tract tumours.

Liver Metastases:

Liver metastases was found in 6 (20%) of cases while 24 cases had no liver involvement on Staging Laparoscopy. Lehnert T et al had 3(20%) patients with liver metastases out of 15 patients undergoing staging laparoscopy precluding liver metastases out of 15 patients

undergoing staging laparoscopy precluding study revealed liver metastases in 12(12.12%) patients out of 99 patients. But 18 out of 20 cases of colon tumour had liver metastases with 2 of them being unresectable. Ozmen MM et al study showed liver metastases in 18(33.3%) cases out of total 48 patients.

Thus in various studies, Liver metastases on diagnostic laparoscopy are found in about 12 – 33% of cases. It was seen in 20% of cases in our study, which was found to be similar to other similar studies.

Peritoneal nodules :

Peritoneal nodules were found in 8 (26.7%) cases in our study. Mostly they were seen in patients with stomach malignancies. Only 1 case of colorectal malignancy & 1 case of gall bladder malignancy had peritoneal nodules. Muntean V study revealed peritoneal seeding in 32 (32.3%) cases & in 1 case of colon malignancy out of 20cases. Ozmen MM et al study on gastric cancer revealed peritoneal seeding in 8 cases (16,6%) out of 48.

Thus previous studies have revealed Peritoneal seeding in 16 – 32% cases. In our study it was found to be in 26.7% cases which were in

accordance to the other studies. These peritoneal nodules were missed on CT scan & other imaging modalities. Staging laparoscopy was found to be most sensitive modality for peritoneal seedlings.

Ascites :

In our study Ascitic fluid was found in 11(36.7%) cases. Ascitic fluid was aspirated in each case and sent for cytological analysis. No irrigation cytology was done in this study. Most of the case had free fluid evident on pre operative imaging modality had negative cytology on Ascitic fluid analysis pre operatively. Ozmen MM had positive peritoneal cytology in 11 cases out of 48 (22.9%).

Our study results are not comparable to other studies as peritoneal cytology was not routinely performed procedure. It was not done if no ascitic fluid was found on staging laparoscopy.

Omental , Mesentric & Pelvic nodules:

Omental nodules were found in 11 cases in our study. All cases were of Upper Gastrointestinal malignancies – 9 stomach & 2 gall bladder. No colorectal malignancies resulted in omental nodules.

Mesentric & Pelvic Nodules are not found commonly and were reported in only 2 & 3 cases respectively in our study. Pelvic nodules

were seen in 2 cases of colorectal malignancy. 1 case of stomach tumour had Secondaries on bilateral ovaries found on staging laparoscopy. Mesentric nodules were seen in 2 cases of stomach tumours

1 case of stomach tumour was found to have splenic nodule.

Lymph Node status:

Lymph nodes were found to be involved by lymphatic spread from tumour which is seen quite early in tumour spread. In our study lymph nodal metastases was found in 29 out of 30 patients. It does not prevent curative resection unless extensive involvement (N3 status). Even in such cases palliative resection is possible, so lymph node staging as independent predictor does not have much impact in changing management & preventing exploratory laparotomies.

Resectability According to Tumour site:

On staging laparoscopy, in our study 17 cases were deemed Resectable & 13 cases as Unresectable. In our study 43.3% cases were found to be Unresectable on Staging Laparoscopy. These patients were prevented from undergoing unnecessary exploratory laparotomy. Muntean V et al in his study had 36 (36.4%) patients avoided from undergoing unnecessary laparotomies. Hemming AW et al in their study

feel that laparoscopic staging in intraabdominal malignancies is of value & will prevent upto 36% of futile laparotomies.

43.3% patients in our study were prevented from unnecessary laparotomy which was higher than seen in other studies probably as the patients in our study group are not very well educated and present in the later stage of disease compared to Western population. Most of the patient found to be Unresectable did not had severe obstructive symptoms and thus present later in the disease stage.

Further subdivision according to tumour site revealed 10 cases of stomach malignancies to be unresectable out of total 15 cases(66.66%). Further they were analysed according to endoscopic site of tumour which revealed 7 out of 10 cases from body of stomach. Tumour in body of stomach present in later stages of disease as patient does not develop prominent obstructive symptoms seen in fundic or pyloric tumours. 2 cases of pyloric tumour & 1 fundic tumour were found to be unresectable.

Muntean V et al found in his study 26 cases of stomach cancers to be unresectable on Staging laparoscopy out of total 45 cases(57.77%). Asencio F et al did study on gastric adenocarcinoma & found that despite apparently extensive preoperative assessment, laparotomy was

abandoned in 41% of patients after laparoscopic staging.

In our study 66.66% of stomach tumour were found to be unresectable which was higher compared to other studies probably because body of the stomach constituted major part of all the stomach tumours.

In our study there were 13 cases of colorectal malignancies which on further subdivision into Caecum 2, Splenic flexure 1, Upper rectum 3, Middle rectum 2 & lower rectum 5 cases. Only 1(7.7%) case of lower rectal tumour was found to be unresectable on Staging Laparoscopy. Muntean V et al found in his study that 4 cases(20%) to be unresectable. Grobmyer SR et al in their study on Diagnostic laparoscopy prior to planned hepatic resection for colorectal metastases found in their study that staging laparoscopy prevented nontherapeutic celiotomy in 10% of patients.

In our study only Laparoscopy was used for imaging liver metastases from colorectal malignancies and no use of LUS was made resulting in lower detection of hepatic metastases.

Only 2 cases of extrabiliary tumour were present in our study which were both found to be unresectable on Staging Laparoscopy and

thus avoided unnecessary laparotomy. Muntean V et al found 2 cases out of 4(50%) to be unresectable in the study which were found to have extensive spread on Staging Laparoscopy.

There are few series evaluating the use of laparoscopy in patients with gallbladder cancer. Although the yield of laparoscopy was up to 80% in some studies, the patients evaluated had minimal preoperative imaging, often with ultrasound alone, and laparoscopy was used primarily as a diagnostic tool. Results found in our study had only 2 patients which are too low to draw conclusions.

Total 17 cases were found to be resectable on Staging Laparoscopy out of which 16(94%) cases underwent definitive procedure. 1 case (6%) was found to be unresectable on laparotomy which was not found on Staging Laparoscopy due to infiltration into the pancreas.

1 case of unresectable colorectal tumour underwent colostomy & other 7 unresectable cases underwent palliative procedure.

6 cases underwent only laparoscopic biopsy as only procedure after staging laparoscopy.

Duration of Staging Laparoscopy :

Mean duration of Staging Laparoscopy was 18.83 min (10-30mins). It was little higher in unresectable group compared to resectable (20 vs 17mins respectively) which was not found to be significantly different. Muntean V et al in their study had 48 mins mean operative time for SL (25-90mins.) In this study extended staging laparoscopy, peritoneal lavage, LUS including colour doppler was done resulting in more mean time for SL.

Complications :

Procedure related complications were seen in 5 cases in our study out of which4 cases were resectable – 2 major & 2 minor complications. Only 1 case of unresectable group had minor wound sepsis.

There was no mortality in the study group.

Convalescence Period:

Mean convalescence period was 8.2 days (2-16days) in the study. It was found to be significantly less in unresectable group compared to patients undergoing definitive surgery. (P = 0.000)

Convalescence period in patients with complications was 10.8

days compared to 7.6 days in patients without complications, which was not found to be significantly higher.

Convalescence period was very significantly low in patients undergoing SL compared to exploratory laparotomy & closure (5 vs 8 days respectively; P = 0.000) when it is the only procedure required. Similar evidence is found in various studies. In his study Muntean V et al average length of stay after SL compares favourably with open exploration.

Cost effectiveness :

Mean cost for study group was Rs 8,897 (4,665 – 16,150). Cost for Unresectable group was significantly lower compared to resectable group (P = 0.01).

Cost in patients having complications following surgery was also found to be significantly higher compared to other group without complications (P = 0.002).

Cost effectiveness of staging laparoscopy, compared to open procedure was also found to be significantly lower (P=0.023) when performed as the only procedure for the patient. In similar study done by Muntean V et al when done as only procedure SL resulted in 55 -60% reduction in total hospital charges.

CONCLUSION

Staging laparoscopy has a very significant role in abdominal malignancies. It is very accurate in assessing peritoneal seeding, hepatic metastases which are not found on imaging modalities.

A short SL performed just before the planned surgical procedure to certify the operability is found to be safe & very effective and need not be performed as a separate procedure. But short SL is less sensitive in staging compared to extended SL and use of LUS

Staging Laparoscopy is found to be more useful in staging gastric & extra hepatic biliary tumour when compared to colorectal cancers.

Staging Laparoscopy gives additional information regarding extent of the disease intra-abdominally which changes the course of management in significant number of patients. Staging laparoscopy had a significant impact on decisions regarding the treatment plan in patients. It helps in more careful planning of palliative& resectional procedure in advanced conditions.

Staging Laparoscopy has added benefit of performing biopsy from sites of dissemination & having histological confirmation.

Staging Laparoscopy spares malignancy patients from unnecessary laparotomies.

Staging Laparoscopy has been found to significantly decrease the hospital stay & cost expenditure when compared to open exploration.

Limitation of the study was it has small sample size comprising only stomach, gall bladder & colorectal malignancies. Evaluation of lesser sac & pancreatic infiltration was not possible & peritoneal cytology was not done in all cases.

Staging laparoscopy should be a routine tool in the armamentarium of all surgeons performing surgeries routinely on abdominal malignancies. It should be used as a diagnostic tool comprehending other imaging modalities.

SUMMARY

- The present study entitled "Role of diagnostic laparoscopy for staging in abdominal malignancies" was undertaken at STANLEY. Medical College and Hospital from January 2013 to December 2013.
- Staging Laparoscopy was performed in 30 patients (100%).
- Laparoscopy could accomplish proper staging in 29 cases (96.7%) i.e. the sensitivity of SL is 0.97 and specificity of test being 1.
- Unnecessary and futile laparotomies were avoided in 13 patients (43.3%).
- Only 1 patient (3.3%) had to be subjected to laparotomy following SL and found to be unresectable.
- Average duration of laparoscopic surgery was 18.8 minutes.
- Average hospital stay was 8.3 days. It was significantly lower in SL compared to open exploration.
- Mean Hospital cost was Rs. 8,897. SL is cost effective compared to open exploration.
- Morbidity & mortality are found to be very low in patients undergoing only Staging laparoscopy.
- SL was associated with decreased morbidity & pain, faster recovery & quicker initiation of adjuvant therapies.

MASTER CHART

Sl.No	Name	IP No	Age	Sex	Diagnosis	1	2	3	4	5
1	Ponnusamy	45281	65	M	CA STOMACH	+	-	-	+	-
2	Ramesh	24678	68	M	CA STOMACH	-	+	-	+	-
3	Appavu	53772	62	M	COLORECTAL CA	-	-	-	-	+
4	Ibrahim	23527	64	M	COLORECTAL CA	-	-	-	-	+
5	Kannan	42726	53	M	CA STOMACH	-	-	-	-	+
6	Mohamed salim	32527	55	M	CA STOMACH	-	-	-	-	+
7	Kuppusamy	32671	58	M	CA STOMACH	-	-	+	+	-
8	Karna	42672	56	M	CA GALLBLADDER	-	+	-	+	-
9	Joseph	42621	51	M	COLORECTAL CA	-	-	-	-	+
10	Krishnan	42622	46	M	COLORECTAL CA	-	-	-	-	+
11	Syed Ali	42626	44	M	COLORECTAL CA	-	-	-	-	+
12	Babu	53227	35	M	CA STOMACH	-	+	+	+	-
13	Suleman	32521	29	M	COLORECTAL CA	-	-	-	-	+
14	Munniyammal	32525	62	F	COLORECTAL CA	-	-	-	-	+

Sl No	Name	Ip No	Age	Sex	Diagnosis	1	2	3	4	5
15	Prathunisha	23251	64	F	COLORECTAL CA	+	-	+	+	-
16	Dawath Bee	32425	63	F	CA STOMACH	-	+	-	+	-
17	Valliyammal	32252	68	F	CA STOMACH	+	+	+	-	-
18	Mallarkodi	23245	70	F	CA STOMACH	+	+	-	+	-
19	Chandra	24522	69	F	CA GALLBLADDER	+	+	-	+	-
20	Palaniyammal	32522	61	F	COLORECTAL CA	-	-	-	-	+
21	Rukumani	25253	55	F	COLORECTAL CA	-	-	-	-	+
22	Kalayarasi	34252	43	F	COLORECTAL CA	-	-	-	-	+
23	Jansirani	23352	45	F	CA STOMACH	-	-	-	-	+
24	Dhanam	23252	47	F	CA STOMACH	-	-	-	-	+
25	Angammal	23526	48	F	CA STOMACH	+	+	-	-	-
26	Vasantha	65622	49	F	COLORECTAL CA	-	-	-	-	+
27	Krishnaveni	24352	35	F	COLORECTAL CA	-	-	-	-	+
28	Poonkodi	23522	38	F	CA STOMACH	+	-	-	+	-
29	Muthammal	23245	26	F	CA STOMACH	+	+	-	-	-
30	Kavya	24362	28	F	CA STOMACH	+	+	-	-	-

1 – Pertoneal Metastasis

2 – Omental Metastasis

3 – Liver Metastasis

4 – Ascites

5 -Resectability

BIBLIOGRAPHY

1. Udwadia TE. Diagnostic Laparoscopy, a textbook of Laparoscopic surgery in developing countries, 1 ed. New Delhi:Jaypee Brothers;1997,15-43.
2. Stein S Das photo-endosckop: Part 3. Berl Klin Wochen Schr, 1874.
3. Kelling G. Zur colioskopie. Arch Klin Chir 1923;126:226-9.
4. Decker A. Pelvic culdoscopy. In: Meigs JV, Sturgis SH eds. Progress in Gynecology, New York:Grune and Stratton,1946.
5. Light date C J. Laparoscopy and biopsy in malignant liver disease. Cancer 50: 1982.2672- 5.
6. Conlon KC, Toomey D. Diagnostic Laparoscopy. In: Fischer JE, Bland KI, Callery MP, Clagett GP, Jones DB, LoGerfo FW, Seeger JM. Mastery of surgery. 5th ed. New Delhi: Wolters Kluwer (India) pvt. Ltd;2008:251-8.
7. Marshall RL, Jebson PIR, Davie IT, Scott DB. Circulatory effects of carbon dioxide insufflation of the peritoneal cavity for laparoscopy. Br.J Anaesth1972;44:680-4.
8. Harris MNE, Plantevin OM, Crawther A. Cardiac arrhythmias during anaesthesia for laparoscopy. Br.J Anaesth 1984;56:1213-6.

9. Arandia HV, Grogon AW. Comparison of this dense of combined risk factors of gastric acid aspiration. Anaesth analg 1980; 59:862-4.
10. Sivak MV, Schleutermann DA, Lightdale JC. Indications, contraindications and complications of diagnostic laparoscopic. A text book of Gastroenterologic endoscopy. Philadelphia Saunders 2nd ed,2000;1462-75.
11. Karl A, Zucker, Robert W. Bailey, Eddie Joe Reddik, eds. Fundamentals. a textbook of Surgical laparoscopy. Quality Medical Publishing.1991;3-56.
12. Mansi C, Savarino V., Picciotta A, Testa R, Canepa A, Dodero M, et al. Comparison between laparoscopy, ultrasonography and computed tomography in widespread and localized liver disease. Gastrointest Endosc. 1982 May;28(2):83-5.
13. Gandolfi L, Rossi A, Leo P, et al. Indications for laparoscopy before and after the introduction of ultrasonography. Gastrointest Endosc. 1985 Feb;31(1):1-3.
14. Hunerbein M, Rau B, Hohenberger P, Schlag PM et al. The role of staging laparoscopy for multimodal therapy of gastrointestinal cancer. Surg Endosc1998: 12(7):921-5.
15. van Dijkum EJ, de Wit LT, van Delden OM, Kruyt PM, van

Lanschot JJ, Rauws EA et al. Staging laparoscopy and laparoscopic ultrasonography in more than 400 patients with upper gastrointestinal cancer. J Am Coll Surg1999: 189:459-65.

16. Bogen GL, Manino AT, Scott-Conner C. Laparoscopy for staging and palliation of gastrointestinal malignancy. Surgical Clinics of North America. 1996; 76(3):557-69.
17. Andren-Sandberg A, Lindberg CG, Lundstedt C, Ihse I. et al. Computed Tomography and Laparoscopy in the Assessment of the patient with Pancreatic Cancer. J Am Coll Surg. 1998 Jan;186(1):35-40.
18. Tsioulias GJ. Wood TF. Chung MH. Morton DL. Bilchik A. Diagnostic laparoscopy and laparoscopic ultrasonography optimize the staging and resectability of intraabdominal neoplasms. Surg Endosc. 2001 Sep;15(9):1016-9.
19. Alfred Cuschieri. Role of video-laparoscopy in the staging of intra-abdominal lymphomas and gastrointestinal cancer. Semin Surg Oncol.2001 Mar;20(2):167-72.
20. J.R. Siewert,. Invited Commentary. World J. Surg. 24, 1135 (2000).
21. Rosin D, Brasesco O, Rosenthal RJ. Laparoscopy for gastric tumours. Surg Oncol Clin N Am. 2001 Jul;10(3):511-29.

22. Oñate-Ocaña LF, Gallardo-Rincón D, Aiello-Crocifoglio V, Mondragón- Sánchez R, de-la-Garza-Salazar J. The role of pretherapeutic laparoscopy in the selection of treatment for patients with gastric adenocarcinoma: a proposal for a laparoscopic staging system Ann Surg Oncol 2001 Sep;8(8):624-31.
23. Mansfield PF. Laparoscopic staging for gastric cancer. Ann Surg Oncol 2001 Sep;8(8):622-3.
24. Yano M, Tsujinaka T, Shiozaki H, Inoue M, Sekimoto M, Doki Y, et al. Appraisal of treatment strategy by staging laparoscopy for locally advanced gastric cancer. World J Surg. 2000;24(9):1130–5.
25. Conlon KC. Staging laparoscopy for gastric cancer. Ann Ital Chir. 2001;72(1):33–37.
26. Fleming ID. AJCC/TNM cancer staging, present and future. J Surg Oncol. 2001;77(4):233–236.
27. Halpert RD, Feczko PF. Role of radiology in the diagnosis and staging of gastric malignancy. Endoscopy. 1993 Jan;25(1):39-45.
28. Mercer DW, Robinson EK. Stomach. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL. Sabiston Textbook of Surgery. 18th ed. Philadelphia, PA: WB Saunders;2008: p. 1263.

29. Jerby BL, Milsom JW. Role of laparoscopy in the staging of gastrointestinal cancer. Oncology. 1998 ;12(9):1353–60.

30. Hemming AW, Nagy AG, Scudamore CH, Edelmann K. Laparoscopic staging of intraabdominal malignancy. Surg Endosc 1995;9:325–8.

31. Babineau TJ, Lewis D, Jenkins RL, Bleday R, Steele GD Jr, Forse RA. Role of staging laparoscopy in the treatment of hepatic malignancy. Am J Surg1994 Jan;167(1):151-5.

32. John TG, Greig JD, Crosbie JL, Miles WF, Garden OJ. Superior staging of liver tumours with laparoscopy and laparoscopic ultrasound. Ann Surg1994;220:711–9.

33. Eubanks S. The role of laparoscopy in diagnosis and treatment of primary or metastatic liver cancer. Sem Surg Oncol 1994;10(6):404–10.

34. Nord HJ, Boyd WP. Diagnostic laparoscopy. Endoscopy 1992 Jan-Feb;24(1-2):133–137.

35. Nishizaki T, Matsumata T, Adachi E, Sugimachi K. Laparoscopy preferable to imaging procedures in detecting metastases of a pancreas carcinoma to the liver. Report of two cases. Surg Endosc 1994;8(11):1340–2.

36. Ward BA, Miller DL, Frank JA, Dwyer AJ, Simmons JT, Chang

R et al. Prospective evaluation of hepatic imaging studies in detection of colorectal metastases: correlation with surgical findings. Surgery 1989;105:180–7.

37. Gunven P, Makuuchi M, Takayasu K, Moriyama N, Yamasaki S, Hasegawa H. Preoperative imaging of liver metastases: comparison of angiography, CT scan and ultrasonography. Ann Surg 1985;202:573–9.
38. Brady PG, Goldshimid S, Chappel G, Slone FL, Boyd WP. A comparison of biopsy techniques in suspected focal liver disease. Gastrointest Endosc 1987; 33(4):289–92.
39. Brady PG, Pebbles M, Goldshimid S. Role of laparoscopy in the evaluation of patients with suspected hepatic or peritoneal malignancy. Gastrointest Endosc1991;37(1):27–30.
40. D'Angelica M, Fong Y, Weber S, Gonen M, DeMatteo RP, Conlon K, et al. The role of staging laparoscopy in hepatobiliary malignancy: prospective analysis of 401 cases. Ann Surg Oncol 2003 March;10(2)183-9.
41. Lo CM, Lai EC, Liu CL, Fan ST, Wong J. Laparoscopy and laparoscopic ultrasonography avoid exploratory laparotomy in patients with hepatocellular carcinoma. Ann Surg 1998 April;227(4):527-32.

42. D'Angelica M, Fong Y. The liver. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL. Sabiston Textbook of Surgery. 18th ed. Philadelphia, PA: WB Saunders;2008:1503.

43. Corvera CU, Weber SM, Jarnagin WR. Role of laparoscopy in the evaluation of biliary tract cancer. Surg Oncol Clin N Am. 2002 Oct;11(4):877-91.

44. Burke EC, Jarnagin WR, Hochwald SN, Pisters PW, Fong Y, Blumgart LH. Hilar cholangiocarcinoma: patterns of spread, the importance of hepatic resection for curative operation, and a presurgical clinical staging system. Ann Surg 1998;228:385–394.

45. Bartlett DL, Fong Y, Fortner JG, Brennan M, Blumgart LH. Long-term results after resection for gallbladder cancer. Implications for staging and management. Ann Surg 1996; 224:639–46.

46. Jarnagin WR, Bodniewicz J, Dougherty E, Conlon K, Blumgart LH, Fong Y. A prospective analysis of staging laparoscopy in patients with primary and secondary hepatobiliary malignancies. J Gastrointest Surg 2000; 4(1):34–43.

47. Barbot DJ, Marks JH, Feld RI, Liu JB, Rosato FE. Improved staging of liver tumours using laparoscopic intraoperative ultrasound. J Surg Oncol 1997;64: 63–67.

48. Kosuge T, Yamamoto J, Shimada K, Yamasaki S, Makuuchi M. Improved surgical results for hilar cholangiocarcinoma with procedures including major hepatic resection. Ann Surg 1999;230:663–671.

49. Klempnauer J, Ridder GJ, Werner M, Weimann A, Pichlmayr R. What constitutes long-term survival after surgery for hilar cholangiocarcinoma? Cancer 1997;79(1):26–34.

50. Jarnagin WR, Fong Y, DeMatteo RP, Gonen M, Burke EC, Bodniewicz J, et al. Staging analysis of resectability and outcome in 225 patients with hilar cholangiocarcinoma. Ann Surg 2001;234(4):507-19.

51. Chari RS, Shah SA. Biliary system. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL. Sabiston Textbook of Surgery. 18th ed. Philadelphia, PA: WB Saunders;2008:1581.

52. Stojadinovic A, Brooks A, Hoos A, Jaques DP, Conlon KC, Brennan MF. An evidence-based approach to the surgical management of resectable pancreatic adenocarcinoma. J Am Coll Surg 2003;196:954–64.

53. Sener SF, Fremgen A, Menck HR, Winchester DP. Pancreatic cancer: a report of treatment and survival trends for 100,313 patients diagnosed from 1985–1995, using the National Cancer

Database. J Am Coll Surg 1999;189:1–7.

54. Luque-de Leôn E, Tsiotos GG, Balsiger B, Barnwell J, Burgart LJ, Sarr MG. Staging Laparoscopy for Pancreatic Cancer Should Be Used to Select the Best Means of Palliation and Not Only to Maximize the Resectability Rate. J Gastrointest Surg. 1999 Mar-Apr;3(2):111-7.
55. Jimenez RE, Warshaw AL, Rattner DW, Willett CG, McGrath D, Fernandez- del Castillo C. Impact of Laparoscopic Staging in the Treatment of Pancreatic Cancer. Arch Surg. 2000 Apr;135(4):409-14.
56. Schachter, P. P., Avni, Y., Shimonov, M., Gvirtz, G., Rosen, A., and Czerniak, A. The Impact of Laparoscopy and Laparoscopic Ultrasonography on the Management of Pancreatic Cancer. Archives of Surgery 2000;135(11):1303-7.
57. Minnard EA, Conlon KC, Hoos A, Dougherty EC, Hann LE, Brennan MF. Laparoscopic Ultrasound Enhances Standard Laparoscopy in the Staging of Pancreatic Cancer. Ann Surg. 1998 Aug;228(2):182-7.
58. Hunerbein, M., Rau, B., Hohenberger, P., and Schlag, P. M. The Role of Staging Laparoscopy for Multimodal Therapy of Gastrointestinal Cancer. Surgical Endoscopy 1998;12(7):921-5.

59. Vollmer CM, Drebin JA, Middleton WD, Teefey SA, Linehan DC, Soper NJ et al. Utility of staging laparoscopy in subsets of peripancreatic and biliary malignancies. Ann Surg 2002;235:1–7.
60. Pisters PW, Lee JE, Vauthey JN, Charnsangavej C, Evans DB. Laparoscopy in the Staging of Pancreatic Cancer. Br J Surg 2001 Mar;88(3):325-37.
61. Barreiro CJ, Lillemoe KD, Koniaris LG, Sohn TA, Yeo CJ, Coleman J et al. Diagnostic Laparoscopy for Periampullary and Pancreatic Cancer: What Is the True Benefit? J Gastrointest Surg. 2002 Jan-Feb;6(1):75-81.
62. Stefanidis D, Grove KD, Schwesinger WH, Thomas CR Jr. The current role of staging laparoscopy for adenocarcinoma of the pancreas: a review. Ann Oncol. 2006 Feb;17(2):189-99.
63. Liu RC, Traverso LW. Laparoscopic Staging Should Be Used Routinely for Locally Extensive Cancer of the Pancreatic Head. Journal of Gastrointestinal Surgery 2004;8(8):923-4.
64. Shoup M, Winston C, Brennan MF, Bassman D, Conlon KC. Is There a Role for Staging Laparoscopy in Patients With Locally Advanced, Unresectable Pancreatic Adenocarcinoma? J Gastrointest Surg. 2004 Dec;8(8):1068-71.
65. Clarke DL, Thomson SR, Madiba TE, Sanyika C. Preoperative

imaging of pancreatic cancer: a management-oriented approach. J Am Coll Surg2003;196:119–29.

66. Morganti AG, Brizi MG, Macchia G, Sallustio G, Costamagna G, Alfieri S et al. The prognostic effect of clinical staging in pancreatic adenocarcinoma. Ann Surg Oncol2005;12:145–151.
67. Maire F, Sauvanet A, Trivin F, Hammel P, O'Toole D, Palazzo L et al. Staging of pancreatic head adenocarcinoma with spiral CT and endoscopic ultrasonography: an indirect evaluation of the usefulness of laparoscopy. 2004;4(5):436-40.
68. Nieveen van Dijkum EJ, Romijn MG, Terwee CB, de Wit LT, van der Meulen JH, Lameris HS et al. Laparoscopic staging and subsequent palliation in patients with peripancreatic carcinoma. Ann Surg 2003;237:66–73.
69. Kwon AH, Inui H, Kamiyama Y. Preoperative laparoscopic examination using surgical manipulation and ultrasonography for pancreatic lesions. Endoscopy2002;34(6):464–8.
70. Conlon KC, Dougherty E, Klimstra DS, Coit DG, Turnbull AD, Brennan MF. The value of minimal access surgery in the staging of patients with potentially resectable peripancreatic malignancy. Ann Surg1996;223:134–140.
71. Liu RC, Traverso LW. Diagnostic laparoscopy improves staging

of pancreatic cancer deemed locally unresectable by computed tomography. Surg Endosc. 2005;19(5):638-42.

72. Yoshida T, Matsumoto T, Morii Y, Ishio T, Kitano S, Yamada Y et al. Staging with helical computed tomography and laparoscopy in pancreatic head cancer. Hepatogastroenterology 2002; 49(47):1428–1431.
73. Connor S, Bosonnet L, Alexakis N, Raraty M, Ghaneh P, Sutton R et al. Serum CA19-9 Measurement Increases the Effectiveness of Staging Laparoscopy in Patients With Suspected Pancreatic Malignancy. Dig Surg. 2005;22(1-2):80-5.
74. John TG, Wright A, Allan PL, Redhead DN, Paterson-Brown S, Carter DC et al. Laparoscopy With Laparoscopic Ultrasonography in the TNM Staging of Pancreatic Carcinoma. World J Surg. 1999 Sep;23(9):870-81.
75. Steer ML. Exocrine Pancreas. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL. Sabiston Textbook of Surgery. 18th ed. Philadelphia, PA: WB Saunders;2008: p. 1616.
76. Jarnagin WR, Conlon K, Bodniewicz J, Dougherty E, DeMatteo RP, Blumgart LH et al. A clinical scoring system predicts the yield of diagnostic laparoscopy in patients with potentially resectable hepatic colorectal metastases. Cancer2001;91:1121-

1128.

77. Rahusen FD, Cuesta MA, Borgstein PJ, Bleichrodt RP, Barkhof F, Doesburg T et al. Selection of patients for resection of colorectal metastases to the liver using diagnostic laparoscopy and laparoscopic ultrasonography. Ann Surg. 1999 Jul;230(1):31-7.

78. Thaler K, Kanneganti S, Khajanchee Y, Wilson C, Swanstrom L, Hansen PD. The evolving role of staging laparoscopy in the treatment of colorectal hepatic metastases. Arch Surg. 2005 Aug;140(8):727-34.

79. Goletti O, Celona G, Galatioto C, Viaggi B, Lippolis PV, Pieri L et al. Is laparoscopic sonography a reliable and sensitive procedure for staging colorectal cancer? A comparative study. Surg Endosc. 1998 Oct;12(10):1236-41.

80. Ozmen MM, Zulfikaroglu B, Ozalp N, Ziraman I, Hengirmen S, Sahin B. Staging laparoscopy for gastric cancer. Surg Laparosc Endosc Percutan Tech. 2003 Aug;13(4):241-4.

81. Lehnert T, Rudek B, Kienle P, Buhl K, Herfarth C. Impact of diagnostic laparoscopy on the management of gastric cancer: prospective study of 120 consecutive patients with primary gastric adenocarcinoma. Br J Surg. 2002 Apr;89(4):471-5.

82. Muntean V, Oniu T, Lungoci C, Fabian O, Munteanu D, Molnar G et al. Staging laparoscopy in digestive cancers. J Gastrointestin Liver Dis. 2009 Dec;18(4):461-7.

83. Asencio F, Aguiló J, Salvador JL, Villar A, De la Morena E, Ahamad M et al. Laparoscopic staging of gastric cancer A prospective multicenter comparison with noninvasive techniques. Surg Endosc. 1997 Dec;11(12):1153-8.

84. Grobmyer SR, Fong Y, D'Angelica M, Dematteo RP, Blumgart LH, Jarnagin WR. Diagnostic laparoscopy prior to planned hepatic resection for colorectal metastases. Arch Surg. 2004 Dec;139(12):1326-30.

PROFORMA

- NAME :

  SL. NO:
- AGE /SEX:
- ADDRESS WITH CONTACT NUMBER:
- IP NO:
- DATE OF ADMISSION:
- DATE OF SURGERY:

HISTORY OF PRESENTING ILLNESS:

Pain : duration

Location

Mass

Vomiting

Nausea

Fever

Constipation/diarhoea

Hemetemesis , malena, weight loss

PAST HISTORY:

WHETHER A KNOWN CASE OF DM/HYPERTENSION/ASTHMA/TB/EPILEPSY/CARDIAC ILLNESS

H/O SIMILAR EPISODES IN THE PAST, IF ANY:

H/O any abdominal surgeries

FAMILY HISTORY:

TREATMENT HISTORY:

CLINICAL EXAMINATION:

GENERAL EXAMINATION: temp: p.r: bp:

SYSTEMIC EXAMINATION:

CVS

RS

PER ABDOMEN: soft/distended

Mass , size ,extent ,fixity , movement with respiration

CLINICAL DIAGNOSIS:

INVESTIGATIONS:

Cbc: hb,tc,dc,esr ,rbs,rft,cxr,ecg,

Usg ,CECT , OGD SCOPY, COLONOSCOPY

SURGERY DONE: DIAGNOSTIC LAPROSCOPY

CONSENT FOR DIAGNOSTIC LAPAROSCOPY

Patient Name: Age:

Sex: M/F

Consultant: IP No:

I have been explained about the procedure of diagnostic laparoscopy, where a 5mm port will be put into peritoneal cavity under local anaesthesia and a abdomen will be visualized for the purpose of tumour extension in abdominal cavity.

I am aware that following this procedure the under mentioned complications could occur namely,

1. Bleeding , Air embolism
2. Cardiorespiratory embarrassment
3. Hollow viscus perforation (stomach, bowel, bladder)
4. Solid viscus injury (Liver, spleen when grossly enlarged)
5. Blood vessel injury (in abdominal wall & peritoneal cavity)

I Hereby give consent for this biopsy for myself

	Signature	Name	Date	Time
Patient				
Witness				
Doctor				
Interpreter				